

SOUTHEASTERN BIOLOGY

(Formerly *The ASB BULLETIN*)



Volume 48

September, 2001

Number 3

ONLY CALL FOR PAPERS FOR THE 63rd MEETING

ABSTRACT SUBMISSION – SEE PAGE --- 246



Eugene Odum and Frank McCormick at the Silver Anniversary Luncheon of the SE Chapter of the ESA

*The Official Publication of
The Association of Southeastern Biologists*
<http://www.asb.appstate.edu/>

SOUTHEASTERN BIOLOGY (ISSN 1533-8436)

SOUTHEASTERN BIOLOGY (ISSN 1533-8436) is published quarterly in January, April, September, and December by the Association of Southeastern Biologists, Inc., Carolina Biological Supply Co., 2700 York Road, Burlington, NC 27215. Periodicals postage paid at Burlington, NC, and additional mailing offices. POSTMASTER: please send address changes to the **SOUTHEASTERN BIOLOGY** business manager, Tim Atkinson, Carolina Biological Supply Co., 2700 York Road, Burlington, NC 27215. ASB members receive the **SOUTHEASTERN BIOLOGY** as part of their membership dues. For non-members, the cost is \$5.00 per issue.

All contributions, inquiries about missing numbers and other matters should be addressed to the Print Editor. News items should be sent to the News Editor. Send books to be reviewed to the Book Review Editor. Printed by Allen Press, 1041 New Hampshire St., Lawrence, KS 66044.

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PURPOSE

The purpose of this association shall be to promote the advancement of biology as a science by encouraging research, the imparting of knowledge, the application of knowledge to the solution of biological problems, and the preservation of biological resources. The ASB has representation in Section G Committee of the AAAS. Varying types of membership are available to individuals and institutions. See inside back cover.

TIME AND PLACE OF FUTURE MEETINGS

2002 April 10-13 Appalachian State University, Boone, NC; see: <http://www.asb.appstate.edu/asb2002.htm>
2003 April 9-12 Howard University, Washington, DC.

A MESSAGE FROM THE PRESIDENT

ROBERT R. HAYNES

As was presented to the membership at the annual business meeting in April 2000, ASB has been asked to co-sponsor along with the Humboldt Field Research Institute a new journal entitled *Southeastern Naturalist*. Humboldt also publishes, with co-sponsorship by the Smithsonian Institution, the *Northeastern Naturalist*, which is currently indexed by Biological Abstracts, Cambridge Scientific Abstracts, University Microfilms, and Zoological Record. Humboldt has already received an ISBN number for *Southeastern Naturalist*, and received approval to have the journal indexed in all of the above indices.

Dr. Howard Neufeld, our President during the past annual meeting, appointed an ad hoc committee to look into the possibility of ASB co-sponsoring this journal. The committee has recently reported to me that it recommends ASB co-sponsor the *Southeastern Naturalist* with the following stipulations:

- (1) *Southeastern Naturalist* and its publisher, the Humboldt Institute, will –
 - take advice from ASB regarding the managing editor and editorial board
 - name ASB as a co-sponsor on the page that lists the editorial board
 - give discounted subscription rates to members of ASB and its affiliate societies;
- (2) ASB will –
 - advertise *SEN* in *Southeastern Biology*
 - provide ASB membership lists to *SEN* to allow solicitation of subscriptions
 - have no financial responsibilities nor liability in respect to *SEN*.

Joerg-Henner Lotze, the Senior Editor of *Northeastern Naturalist* and presumably of *Southeastern Naturalist*, has agreed to the above stipulations. Consequently, the ASB Executive Committee has voted to recommend that ASB indeed does co-sponsor *Southeastern Naturalist*.

This journal will give us an additional outlet for our research on the southeastern flora and fauna, and one that is already going to be indexed by many of the major indexing companies. I encourage each of you to consider submitting your manuscripts to the *Southeastern Naturalist*.

Finally, I encourage each of you to begin making plans to attend the annual meeting of our society in Boone, North Carolina, next April. I anticipate an exciting and interesting meeting.



Robert Haynes receives the gavel from Howard Neufeld

**ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
ANNUAL BUSINESS MEETING
FRIDAY, 6 APRIL 2001
RADISSON HOTEL, NEW ORLEANS, LOUISIANA**

Call-to-Order—President Howard Neufeld called the 62nd Annual Meeting of ASB to order at 12:02 PM with 101 members in attendance.

Howard Neufeld announced the agenda was changed moving nominations and voting to earlier in the meeting so interested members could attend the Southeastern Chapter of ESA luncheon beginning at 12:30.

Howard Neufeld asked that the previously distributed minutes of the 2000 business meeting be approved.

Motion 1: Mike Baranski moved for approval of the minutes, Ken Shull seconded the motion, and the motion passed.

Nominations Committee—Committee Chair Eloise Carter thanked the members of the Nominating Committee for their work. She introduced the slate of candidates for each office and called for nominations from the floor for each office. Hearing no nominations, the slate of officers was accepted and voting ensued.

Howard Neufeld announced that ASB had been approached about participation in forming a new journal entitled *Southeastern Naturalist*. President Neufeld indicated the Executive Committee of ASB approved pursuing the idea with additional investigation as to financial and other obligations. He formed an ad hoc committee to lead the investigation. Howard announced the names of the committee members.

Resolutions Committee—Pat Parr, Chair, announced the committee had two resolutions to submit to the members. The first was from the Conservation Committee concerning exotic pests and was previously approved by the Executive Committee. Mike Baranski asked to whom the resolution would be sent and Pat said she would ask Nancy to forward the names of the recipients. A friendly amendment to add that additional research should be encouraged was offered and withdrawn.

Resolution 1: Resolution on Exotic Pests. Passed.

The second resolution was the resolution of appreciation to Tulane and Loyola universities for their efforts in hosting the 2001 Annual Meeting.

Resolution 2: Resolution of Appreciation to Tulane University and Loyola University. Passed.

Local Arrangements Committee—Hank Bart and Craig Hood jointly presented the committee's report. They announced that there were over 700 registrants before on-site registration began and attendance grew to around 800 with on-site

registration included. While finances were unavailable at meeting time, they indicated that financial concerns should come out fine. They made the announcement that this evening's banquet would be held in Ballroom B with a social hour in the foyer. Craig mentioned that the workshop shuttle leaves at 11:00 AM.

President's Report—Howard Neufeld began by announcing that committee interest forms were available and if anyone was interested in working on a committee, they should fill one out and give it to Robert Haynes or another member of the Executive Committee. He also announced that all attendees of the Saturday morning EC meeting should let Robert know in order to get an accurate head count for breakfast. Howard announced the web site had been updated and the Association's finances were in good shape. He stated that the Southeastern Fisheries Council would be meeting every other year with ASB. Howard indicated that John Herr is moving ahead with organizing the Association's archives and that ASB has entered into an agreement with Emory University for housing the archives and entered into a separate agreement with the University of Georgia for housing the type set of the Association's bulletin.

Secretary's Report—Howard asked members applying for emeritus status be announced. Terry Richardson read the following names as applied for emeritus status with ASB: Joe B. Black, Diane R. Nelson, James D. Perry, and Clarence E. Styron.

Motion 2: A motion was made and seconded that these members having met the criteria be awarded emeritus status in the Association. Motion passed.

Terry announced news received of deceased members over the past year. Those known were Ted Browne of the University of Memphis, Don Hayne of UNC Chapel Hill, and David Lindquist of UNC Wilmington. A moment of silence was given for these members.

Treasurer's Report—Tim Atkinson provided a Treasurer's Report showing a slight deficit at the moment. He introduced a zero-sum balance and then presented the 2002 budget. The budget passed. Tim indicated that we currently have over 1,000 members paid up and likely have over 1,400 members.

Print Editor's Report—Jim Caponetti indicated materials needed for publication continue to arrive in a timely manner. He mentioned that a new ISSN number had to be obtained for the bulletin since the name was changed.

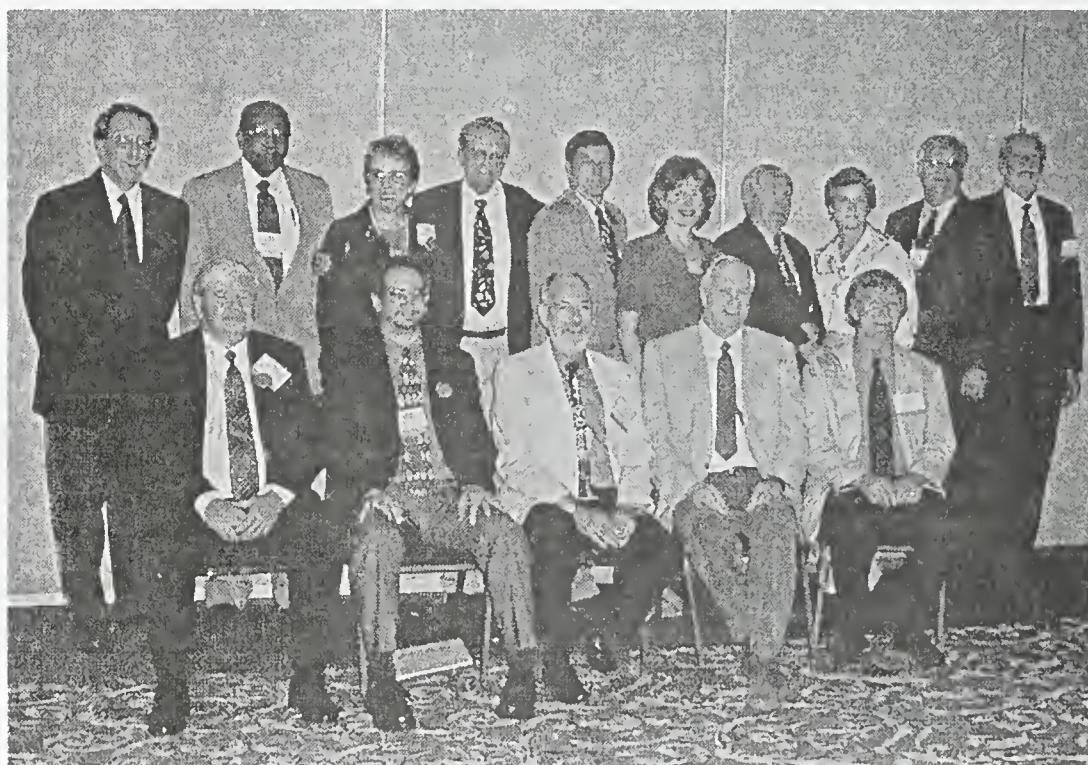
New Business—Howard Neufeld indicated that Tim Atkinson, Pat Parr and Joe Pollard had worked on presenting constitution changes for the new Membership Officer position approved by the Executive Committee. The changes to the Association's Constitution and Bylaws were voted on and approved. Howard asked that he or Robert would accept volunteers for the new position.

Adjournment—The meeting adjourned at 12:32 PM.

Respectfully Submitted, Terry D. Richardson, Secretary



Officers and Staff of ASB. Seated from left: Rebecca Cook, Howard Neufeld, Bonnie Kelly, Terry Ricahrdson. Standing from left: Michael Dennis, Gerhard Kalmus, Kim Marie Tolson, Robert Haynes, James Caponetti, Tim Atkinson, Kenneth Shull.



Past Presidents of ASB. Seated from left: Bill Martin, Howard Neufeld, Joe Winstead, Jim Fralish, Ken Marion. Standing from left: Mike Baranski, Lafayette Frederick, Rebecca Sharitz, Ray Flagg, Ross Hinkle, Pat Parr, Whit Gibbons, Eloise Carter, Jim Ross, John Herr.

EVENTS OF THE 2001 ANNUAL MEETING IN NEW ORLEANS HOSTED BY TULANE UNIVERSITY AND LOYOLA UNIVERSITY

Thomas R. Wentworth, Meritorious Teaching Award

The 2001 winner of the ASB Meritorious Teacher Award was Dr. Thomas R. Wentworth, Professor of Botany at North Carolina State University. Dr. Wentworth was born in Cambridge, Massachusetts, and grew up and attended high school in Watertown, Massachusetts. He earned his undergraduate degree at Dartmouth College, where he first developed an interest in plant ecology under the tutelage of Dr. William Reiners. He went on to do his graduate work under the direction of Dr. Robert H. Whittaker at Cornell University, though his dissertation research was carried out in the desert southwest (Arizona). Despite those northeastern and southwestern beginnings, after completing his graduate degrees Dr. Wentworth took a faculty position at North Carolina State, and he has been an active participant in the Association of Southeastern Biologists and the southeastern section of the Ecological Society of America for these past 25 years.

Over the years he has taught more than a dozen different plant biology and ecology courses in the Botany Department at North Carolina State, and served as research advisor to numerous undergraduates and over 20 graduate students. He has insisted on continuing to have outdoor field trips be an integral part of his courses, even when enrollments swelled to nearly a hundred students, and his enthusiastic leadership of field trips has won particular praise from many of his present and former students.

Students spoke particularly of Dr. Wentworth's ability to explain things with contagious enthusiasm in class and laboratory sessions. One wrote, "His clarity of presentation, organization, and enthusiasm for the subject matter helped me immensely," and another said, "I have not had [any other] class that I enjoyed as much or found as informative as [his] class."

His ability to project his patience and caring toward each student is repeatedly mentioned in the letters from former students. "One of the most patient and considerate teachers I have ever met," said one. And another wrote, "He always seemed interested in talking about my personal interest in education." A third observed, "He was always available to assist anyone" who was having difficulty, and another summed it up this way: "He has a way of making a large class . . . seem small."

Students who got their first taste of doing research with Dr. Wentworth agreed that he "functioned superbly as a mentor." "He has very high standards and demands [the same] of his students," said one student, but he always "delivered criticism in a constructive fashion." Others noted the same thing: he has "real interest in helping us improve our understanding of good science," said one, and another noted, "he kept us thinking about how what we are doing fit into the larger picture." A colleague wrote of him that "His patience and enthusiasm for students is a constant—no matter if the student is an undergraduate asking the most routine questions or a graduate student floundering with her research objectives." A fifth student pointed out that he is always willing to help his students with their research, whether it is "with strenuous field work or tedious data analysis."

And finally, one graduate student wrote of him perhaps the best thing that any teacher can hope to have said about him/her: "I have tried to emulate his ability to motivate the learning process in others."



Stewart Ware presents the Meritorious Teaching Award to Thomas Wentworth.



Lynsey Peterson receives the Eugene P. Odum Award from Ken Marion (left). Eugene Odum and Joe Pollard assist.

2001 RESEARCH AWARD RECIPIENTS

ASB FACULTY RESEARCH AWARD

No award was made this year.

ASB STUDENT RESEARCH AWARD AND ASB STUDENT RESEARCH AWARD IN AQUATIC BIOLOGY

The ASB Student Research Award sponsored by the Martin Microscope Company and the ASB Student Research Award in Aquatic Biology sponsored by the Wildlife Supply Company/WILCO were both presented by Scott Franklin to **Kirk Barnett** of Marshall University for his paper "Analyses of mtDNA and morphometrics of *Gambusia* sp (Pisces : Poeciliidae) in the green bottom wildlife management area, West Virginia" co-authored with **Michael Little** and **Donald Tarter**, SE Biology Abstr. 161, 48(2).

EUGENE P. ODUM AWARD

The Eugene P. Odum Award sponsored by the SE Chapter of ESA was presented by Ken Marion to **Lynsey Peterson** of Furman University for her paper "Spread of metals through an invertebrate food chain as influenced by a nickel-hyperaccumulating plant *Alyssum pintodasilvae*" co-authored with **Joseph Pollard**, SE Biology Abstr. 135, 48(2). Eugene Odum was present when the award was made.

THE NORTH CAROLINA BOTANICAL GARDEN AWARD

The North Carolina Botanical Garden Award sponsored by the NCBG was presented by Johnny Randall to two individuals for the first time. One award was given to **Patrick Moore** of Southern Illinois University for his paper "Silvicultural guidelines for the reintroduction of American chestnut in the central hardwood region" co-authored with **James Zaczek**, SE Biology Abstr. 233, 48(2). The other award was given to **Alaa Wally** of the Archbold Biological Station for his paper "Challenges of conserving a critically endangered pitcher plant," SE Biology Abstr. 109, 48(2).

ASB POSTER AWARD

The ASB Poster Award was presented by George Cline to **Mollie Cashner** of the University of Southern Mississippi for her poster "Responses of five common freshwater fishes to conspecific skin extract," SE Biology, Poster 2, 48(2).

The committee also singled out the following six posters for honorable mention:

Christopher Helps, Laura Speith, Jean Porterfield, and Dennis Haney of Furman University for their poster "A study of body morphology and microhabitat

use of several families of freshwater fish in the Enoree River Basin, SC," SE Biology, Poster 6, 48(2).

Salvatore Agosta and David Morton of Frostburg State University for their poster "Spatial and temporal dietary variation by the big brown bat in Pennsylvania and western Maryland," SE Biology, Poster 24, 48(2).

Darwin Jorgensen, Trevor Wilkes, and Lea Beaulieu of Roanoke College for their poster "Respiratory support of submerged walking in the blue crab, *Callinectes sapidus*," SE Biology, Poster 29, 48(2).

Cynthia Wilson, Mark Meade, and Charles Olander of Jacksonville State University for their poster "Sublethal effects of Phloxine B on population growth kinetics and aerobic metabolic rates in *Tetrahymena* spp," SE Biology, Poster 41, 48(2).

John Weber and Joseph Pollard of Furman University for their poster "An allozyme study of the endangered aquatic plant *Sagittaria fasciculata*," SE Biology, Poster 73, 48(2).

Maria Mayrhofer, Zack Murrell, and Ray Williams of Appalachian State University for their poster "Demography and reproductive ecology of the imperiled Heller's Blazing Star," SE Biology, Poster 88, 48(2).

SE DIVISION OF AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS AWARD

The Southeastern Division of ASIH Award was presented by the Society's Division President Debbie Moore for Ichthyology to **Kyle Piller** of Tulane University for his paper "Ecomorphological variation within the *Etheostoma blennioides* complex (Teleostomi : Percidae)," SE Biology Abstr. 143, 48(2); and for Herpetology to **Rey Pellos** of Mercer University for his paper "Habitat associations of larval anurans and their predators along an environmental gradient" co-authored with **Clinton Miller** and **Michael Moore**, SE Biology Abstr. 198, 48(2).

President Moore was also pleased to report that the following four students presenting a paper or a poster at the annual meeting were awarded travel grants:

1. **Eric Blackwell** – Herpetology. Department of Biology, Jacksonville State University, Jacksonville, AL 36265-1602
2. **Steven J. Herrington** – Ichthyology. Dept. of Fisheries & Allied Aquaculture, Auburn University, Auburn, AL 36849
3. **Bryan Phillips** – Ichthyology. Dept. of Fisheries & Allied Aquaculture, Auburn University, Auburn, AL 36849
4. **Thomas Radzio** – Ichthyology. Department of Natural Science, Longwood College, Farmville, VA 23909

GIBBS AWARD FROM THE AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS FOR EXCELLENCE IN SYSTEMATIC ICHTHYOLOGY

The award for 2001 was presented to **Lawrence M. Page** at the Annual ASIH meeting by Dr. Brooks Burr, President of ASIH. Dr. Page recently retired from the Illinois Natural History Survey and now works for NSF in about a two-year program officer position.

SOUTHERN APPALACHIAN BOTANICAL SOCIETY AWARDS

The SABS made three awards this year. Joe Winstead presented the awards.

Earl Core Student Research Award

Presented to assist students with their botany research. The awardees this year are:

1. **Sonja Himes** of Western Carolina University - \$300.00 – "Explorinig the benefits of self-fertility in poke milkweed (*Asclepias exaltata*)."
- 2 **Chris Adams** of the University of Kentucky - \$300.00 – "A comparative study of seed dormancy and germination in four closely related *Aristolochia* (*Aristolochiaceae*) species."
3. **Jess Peirson** of Ohio University - \$300.00 – "A systematic revision of *Collinsonia* L. (*Lamiaceae*)."

Elizabeth Ann Bartholomew Award

Presented to individuals for outstanding service to botany or to the Society. The awardee this year is **R. Dale Thomas**, Professor of Botany, University of Louisiana at Monroe.

Richard and Minnie Windler Award

Presented for the best systematics paper published in Volume 65 (2000) of *Castanea*. The awardee is **Deborah Q. Lewis** of Iowa State University for the publication "A revision of the new world species of *Lindernia* (*Scrophulariaceae*)," *Castania* 65(2): 93-122.

BETA BETA BETA BIOLOGICAL SOCIETY SOUTHEASTERN REGION OUTSTANDING PAPER AND POSTER AWARDS

District I Paper

SCOTT LINDNER. Sigma Psi, Florida Institute of Technology. "Analysis of cyclin B1 and DNA synthesis in synchronized populations of leukemic MOLT-4 cells."

District II Paper

RACHEL RICE. Pi Delta, East Tennessee State University. "Community-acquired resistance between *Moraxella catarrhalis* and *Streptococcus pneumoniae*."

Districts I and II Paper

DOUGLAS BAKER. Mu Iota, Northern Kentucky University. "The effects of sodium diethyldithiocarbamate on the uptake and acute toxicity of chromium and manganese in zebra mussels (*Dreissena polymorpha*)."

District I Poster

STEPHANIE CRAIG and RYAN SMITH. Tau Chi, Armstrong Atlantic State University. "Degradation of chromosomal and plasmid DNA and the potential for transformation of competent cells."

District II Poster

BRIAN DUNDAS. Mu Iota, Northern Kentucky University. "Cloning and expression of a putative magnesium transporter in *Dictyostelium discoideum*."



Kyle Piller receives the SE Division of ASIH Ichthyology Award from Debbie Moore.



Peter Raven delivers the Plenary Address.

EXOTIC INVASIVE SPECIES RESOLUTION, APRIL 6, 2001

WHEREAS exotic species have usually been introduced to ecosystems by human activities, and because these ecosystems usually do not have natural controls (predators, parasites, diseases, climate), a small proportion of these exotics can out-compete native plants and animals; and

WHEREAS some of these exotic plant and animal species become invasive and cause harmful changes to the native habitats, having been shown to:

- alter fire patterns and hydrologic cycles to the detriment of native species and ecosystems,
- transmit diseases or harbor disease organisms,
- eliminate habitat for wildlife by reducing available food, nesting and shelter,
- displace or alter native species by hybridization,
- often be poisonous to native species, and
- change patterns of the web of life; and

WHEREAS the cost of these invasive exotic species has been estimated to cost the United States \$123 billion a year, and

WHEREAS our native forests, meadows, marshes, wetlands, streams, lakes and seashores should be protected as a valuable inheritance because they provide to the public the benefits of soil stabilization, filtration of storm water, energy conservation, natural beauty, food and shelter for wildlife, a wealth of natural products, and recreational resources; and

WHEREAS the native biodiversity present in our great region is threatened by the encroachment of these invading species, as exemplified by the disease which has all but killed the American chestnut tree and changed forever the landscape of the Southern Appalachians, and

WHEREAS the Association of Southeastern Biologists has presented symposia to inform and make its members aware of the vastness of this problem and what can be done to alleviate the problems with exotic invasives, and to preserve the long-lasting relationship between the natural environment and the citizens,

NOW, THEREFORE, BE IT RESOLVED that the Association of Southeastern Biologists

- encourages elected officials, environmentalists, land managers and the general public to support research into methods of control for these exotic invasive species and potentially invasive species;
- encourages the application of biological control methods, where possible;
- encourages education of the general public about the threat posed by these species and how they can displace native species; and
- encourages all members to become involved in combating the introduction and spread of exotic and potentially invasive species within the many natural and unique ecosystems of the United States.

Submitted by Conservation Committee:
Nancy Coile, Chair, Virginia Tolbert, Katie Greenberg

**RESOLUTION OF APPRECIATION TO
TULANE UNIVERSITY AND LOYOLA UNIVERSITY
APRIL 6, 2001**

WHEREAS Tulane University and Loyola University did agree to make all local arrangements for the Association of Southeastern Biologists to hold its annual meeting on April 4-7, 2001 in New Orleans, and

WHEREAS Local Arrangements Co-Chairs Hank Bart and Craig Hood and Program Chair David Heins did an admirable job of orchestrating the events and organizing the paper and poster session, and

WHEREAS Beth Wee organized posters and audiovisuals, Don Hauber coordinated commercial exhibits, Dave White planned field trips, Melinda Epperson handled registration and meeting statistics, Frank Jordan made social arrangements and with Patricia Dorn coordinated Beta Beta Beta, Bruce Fleury arranged transportation, and

WHEREAS the citizenry of New Orleans and the administrators at Tulane University and Loyola University cooperated to welcome ASB to the city of New Orleans and

WHEREAS the students of Tulane University and Loyola University volunteered to assist with local arrangements,

THEREFORE, LET IT HEREBY BE RESOLVED that the members and officers of the Association of Southeastern Biologists give their sincere thanks and appreciation to all involved in making this the excellent and memorable ASB meeting that resulted from the cumulative efforts of these individuals and organizations.

Submitted by Resolutions Committee:
Pat Parr, Chair, Hank Bart, Ed Mills

**CONSTITUTION AMENDMENT
APRIL 6, 2001**

ASB membership amended the Constitution as shown in **BOLD**:

Article IV--Executive Committee

Section 1. The officers of the Association, six (6) Members-at-Large elected by the membership, the Print Editor of **Southeastern Biology**, the **Membership Officer**, the Web Editor of the Association, and the Archivist of the Association shall constitute the Executive Committee. The Print and Web Editors, **Membership Officer**, and Archivist shall be ex officio, nonvoting members with the right to discuss all issues and to propose motions. Members-at-Large shall serve terms of 3 years with two members elected each year.

MEMBERSHIP OFFICER

The Membership Officer is an ex-officio member of the Executive Committee with a three-year term concurrent with the Treasurer's term of office.

Responsibilities:

1. Dues

- a) Receive dues and checks
- b) Forward checks to Treasurer after recording information (or, make arrangements with Treasurer to deposit checks and forward banking information)
- c) Send dues notices
- d) Serve as point of contact to receive undeliverable mailings, change of address notices, and other membership related materials

2. Database

- a) Maintain membership database
- b) Update database as needed
- c) Coordinate with Print Editor to provide updated member information for journal mailing list
- d) Coordination with Web Editor to provide updated member information for website
- e) Report on membership trends to Executive Committee

3. Outreach

- a) Work with President Elect on updates of the Membership Brochure
- b) Identify ways to increase membership and participation in ASB.

OMITTED ABSTRACT

This abstract was accidentally left out of the April 2001 abstract issue listing.

OWENS, JANNA S., ROBERT A. ANGUS & KEN R. MARION. University of Alabama at Birmingham, Birmingham, AL 35294--A refinement of sediment-sensitive aquatic macroinvertebrate metrics.

In recent years the Cahaba River, located in the Birmingham, Alabama region, has experienced dramatic increases in population growth and urbanization in its watershed. A bioassessment of the water quality of the Cahaba River and five of its tributaries was conducted by periodic survey of the benthic macroinvertebrates, with particular emphasis on the evaluation of sedimentation and its effects on the resident biota. Utilizing the EPA Rapid Bioassessment Protocol procedures, riffle collections of macroinvertebrates were performed seasonally during 1999-2000. Two hundred randomly selected organisms per collection site were then identified to genus level and analyzed by a series of community metrics. Each collection site was also evaluated using several indicators of sedimentation loads. There were strong correlations between sediment deposition and the habitat scores ($p < 0.05$), as well as several macroinvertebrate metric results. The EPT (Ephemeroptera, Plecoptera, Trichoptera) Index, percentage chironomids and the Hilsenhoff Biotic Index (HBI) show promise as indicators of community changes due to the impact of increasing sediment loads when impairment of water quality is indicated. The ability to separate the sources of stressors in an aquatic system will become increasingly necessary with the advent of the Total Maximum Daily Load (TMDL) for non-point source pollutants.

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Humboldt Field Research Institute
Association of Southeastern Biologists

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The *Southeastern Naturalist* (ISSN #1528-7092) is part of a two-journal collaborative publishing effort that is based at the Humboldt Field Research Institute, PO Box 9, Steuben, ME 04680-0009. Phone 207-546-2821, FAX 207-546-3042. E-mail: humboldt@loa.com. Copyright © 2002, all rights reserved. Periodical postage paid in Steuben, ME, and additional mailing offices. Published quarterly. Printed by Allen Press, Lawrence, KS. Subscription rate per year for individuals at US addresses, \$40 (students, \$30); institutions at US addresses \$60; Canadian addresses, add \$4; other foreign addresses, add \$8. Subscription exchanges are considered. **Postmaster:** Please send address changes to the above address. **Authors:** Manuscripts, photographs, and other materials for possible publication are welcome. **Co-published journal:** The *Southeastern Naturalist* is co-published with the *Northeastern Naturalist* (ISSN #1092-6194), a journal with a separate Board of Editors. The Humboldt Field Research Institute is a tax exempt 501(c)(3) nonprofit corporation of the State of Maine:

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ASB BANQUET ADDRESS BY PAST PRESIDENT PAT PARR

The Oak Ridge Reservation—More Than the Sum of Its Parts

Many of you have known me for several years now. And some of you actually know what I do at Oak Ridge National Laboratory (ORNL) where I have worked for the past 27 years. My job responsibilities have evolved over the years. I started as a technician working on research related to fluoride and chromium uptake in vegetation. These tasks offered wonderful opportunities to explore the Oak Ridge Reservation as we established sampling plots--and I began to see and appreciate the rich biological resources there. In 1984 I became the manager for the Oak Ridge National Environmental Research Park, and in 1994 I was asked to serve as ORNL Area Manager when that position was established. In my role as Area Manager I am responsible for coordinating research uses on the reservation, natural resource management, and integrated planning for land use. Although many responsibilities have changed, one challenge that has been consistent throughout my career has been the need to increase awareness about the natural resources and the unique value of the Oak Ridge Reservation for research. This has not been easy. Because of historic operations, many people outside of the community associate "Oak Ridge" with contamination--not rich biodiversity. They don't realize most of the contamination and remediation efforts are associated with the three facilities, not on the larger land area that served as a buffer to the facilities. On the other hand, many of the community leaders in Oak Ridge see the large undeveloped land area and think of it as an enormous real estate resource.

I like the statement "more than the sum of its parts" which is often seen on conservation materials. It helps capture the essence of an area like the Oak Ridge Reservation.

We know there've been tremendous changes in the landscape of east Tennessee over the last 60 years. However, biological riches from past landscapes have survived and flourished, protected within the boundaries of the Department of Energy's 34,242-acre Oak Ridge Reservation. This has not been protection on purpose, but came as an indirect result of other activities. Satellite imagery done in 1984 demonstrates the vivid contrast of the reservation with the surrounding areas.

The story of the federal reservation at Oak Ridge begins with World War II--in 1942 as part of the wartime "Manhattan Project," the U.S. Army purchased 59,000 acres along the Clinch River between Kingston and Clinton, Tennessee. The area was rapidly converted into heavily guarded, secret facilities that would contribute to the development of the atomic bomb. These facilities were encircled by a no-man's land of abandoned homes, fields, and forest. The secrecy associated with the Manhattan Project would allow these abandoned lands to escape urbanization that affected the surrounding region and to mature into a

unique ecological treasure. This unplanned conservation has provided opportunity for the preservation of many rare species and communities that have disappeared elsewhere in east Tennessee.

"This island of undisturbed and recovering ecosystems in a sea of disturbed habitats has social and ecological values that increase exponentially with each passing day--values which far outweigh the simple monetary value to be gained from the sale of the land for just one more industrial, commercial or residential development in the name of progress."

Dr. Ed Clebsch, University of Tennessee Botany Professor Emeritus.

Indeed, this "island" boasts over 1,100 vascular plant species, with 21 considered rare enough to be in need of conservation.

A 1995 biodiversity review of the reservation by The Nature Conservancy identified rare plants in more than 270 locations on the reservation. The Nature Conservancy ranked 81 sites as having very high or high significance for conservation and recommended protecting conservation sites based on clusters of rare plants and communities. They recommended long-term protection of three large blocks of land to preserve the integrity of these significant areas.

As a result of The Nature Conservancy report, the Tennessee Natural Areas Program is currently preparing a proposal to the Department of Energy at Oak Ridge to expand the State Natural Areas on the Reservation. They want to recommend that several areas ranking high in conservation significance be registered as State Natural Areas and that these sites be managed and protected as valuable conservation resources into the future.

These areas of conservation significance have matured from a larger landscape that was originally identical to its surroundings—in 1942, about half of the Reservation had been cleared for crops and pasture. Forests have gradually replaced most of the cleared agricultural land through natural succession or planted tree seedlings. Now, about 75% of the reservation is forested.

Although oak-hickory and pine constitute the most common forests, there are many less common ecological communities that support rare plant populations. These communities include cedar glades and barrens, forested river bluffs, cove hardwood forests, and wetlands.

Cedar glades and barrens are fairly common on the Reservation and occur like beads on a necklace as small, drought-prone openings along exposed limestone in the surrounding forest. Hal DeSelm, Jake Weltzin, and Larry Pounds have taken an interest in barrens on the reservation such as the Raccoon Creek Barren.

In one of the cedar barren areas, the rare Tall Larkspur is abundant and the site may contain one of the world's largest populations of this species. This site is one of the seven registered State Natural Areas on the reservation.

River bluffs are also fairly common along the south and southeast boundaries. This rugged environment has important plant communities that are home for several rare plant species such as Appalachian Bugbane and Spreading False-foxglove. Life history studies on the bugbane were done by Rebecca Cook and on the false foxglove by Maureen Cunningham as part of their dissertation work.

A rare Northern White Cedar woodland community also overlooks the Melton Hill reservoir from shaly cliffs--Gary Walker, Appalachian State University, recently collected research samples in that area accompanied by Ed Clebsch and UT students.

Perhaps the largest refuge for rare plants on the Reservation are the almost 600 acres of wetlands. Other than embayments of the river reservoirs, wetlands have become increasingly uncommon in the region. In embayments, mundane species such as sedges, smartweeds, and cattails thrive. But the Reservation also harbors ponds, floodplain pools, boggy forested wetlands, wet meadows, open marshes, and woodland seeps. These ecosystems are home to rarer plants such as Nuttall's Waterweed and Fen Orchid.

These wetland ecosystems and streams in them are also critical habitats for amphibians, reptiles, and fish. Streams free of sediment from agriculture and construction are common on the Reservation, providing habitat for the state-listed Tennessee Dace. This pollution-intolerant species has a statewide distribution which is now concentrated in the Cherokee National Forest in Polk County and the Oak Ridge Reservation. In their 1993 book, "Fishes of Tennessee," Etnier and Starnes say that the Oak Ridge Reservation may have become a stronghold for the species.

As one of very few large tracts of relatively unfragmented forested land remaining in the Ridge and Valley of East Tennessee, the reservation plays an important role in nesting and migration of songbirds. Populations of many songbirds are rapidly declining throughout the world, partly because once large forest blocks are now dwindling in size and quality throughout North America. Many songbirds nest there and even more stop to rest and eat during migration to and from wintering grounds in tropical habitats south of the U.S.

"The Oak Ridge Reservation provides high quality bird habitats because of its large size, position in the landscape, and long term commitment to habitat protection and research,' says Bob Ford, Southeast Partners in Flight Coordinator. "As breeding birds become a more visible part of management plans all across the nation, Oak Ridge has the opportunity to be at the forefront to further increase habitats and provide source populations for many priority bird species in the Ridge and Valley."

Thanks to collaborative efforts of Partners In Flight, which monitors bird species at risk, we know that 27 of the top 28 priority species for conservation in our region are present on the Reservation during breeding season and that many of these species are common or abundant. In fact, five of the top ten most common

breeding birds on the Reservation are among Partners in Flight's species of conservation concern. In addition, species rarely found breeding elsewhere in the Ridge and Valley of East Tennessee--such as the Blue-winged Warbler, the Cerulean Warbler, the Grasshopper Sparrow, and the Prothonotary Warbler--are known to breed on the Reservation. In fact, more species of breeding birds (nearly 200) have been documented on the Oak Ridge Reservation than on any other single tract of land in Tennessee.

The Oak Ridge Reservation is also a Tennessee Wildlife Resources Agency wildlife management area. With more than 315 wildlife species present, this designation provides opportunities to protect and restore the more than 20 rare wildlife species as well as the once rare wild turkey and the previously federally listed osprey. As with plants, the entire reservation has not been surveyed for wildlife species and potential habitat for at least another 20 rare wildlife species exists. Research by graduate students has provided important information about various wildlife species--for example the work by Katy Greenberg on the gray fox and by Vijak Chimchome on birds.

Secretary of Energy Bill Richardson designated part of the reservation as a scenic and wildlife refuge in 1999 to help balance recent industrialization in parts of the reservation with better protection for unique habitats and wildlife. This approximately 3,000-acre parcel includes one of the landscape complex areas recommended for protection by The Nature Conservancy. The refuge is to be managed over the long-term for preservation purposes through a cooperatively arrangement between DOE and the Tennessee Wildlife Resources Agency.

Increased awareness of the biological richness has resulted in strong public interest in land use planning for the Reservation, especially since the Department of Energy has been under increasing pressure to release land for residential and industrial development.

I initiated a public nature walk program a few years ago using volunteers as guides, to show folks in the community wildflowers, birds and other wildlife, historic sites, and streams on the reservation. Participants have welcomed the opportunity to experience parts of the reservation not normally open to the public. This, along with other efforts to increase awareness, has resulted in the establishment of an active grassroots community group advocating wise stewardship of the Oak Ridge Reservation.

Loss of land is a real issue at Oak Ridge. The reservation was originally 58,575 acres. Much of that original area became the residential portion of Oak Ridge. In recent years, however, there have been numerous piecemeal conveyances of land from DOE for residential and industrial development both through sales and leasing resulting in fragmentation and loss of habitat. The reservation is now 34,242 acres--about half of the original size.

This loss of the land base threatens not only the biological resources, but also unique opportunities provided by the Oak Ridge National Environmental

Research Park. The Research Park is a 20,000-acre outdoor laboratory on the reservation used for environmental research and education.

The Ecological and Physical Sciences Study Center offers a variety of hands-on learning experiences on the Research Park. I initiated the Study Center in 1984 for students (K-12) and teachers. Over 170,000 students and teachers participated in Study Center activities between 1984 and 2000.

There are many opportunities for graduate and undergraduate students and faculty. Students, faculty, and researchers from all over the country use the Research Park for a variety of projects ranging from invasive plant studies (such as those now underway by Sara Drake) to remediation research to global climate change (with researchers from multiple universities and agencies). Last year more than 245 individuals representing over 40 colleges, universities, government agencies, or other institutions used the Research Park. The rich biological resources of the reservation play a key role in the ability to do environmental research. These resources along with restricted public access, equipped research sites, and long-term data have made it an attractive resource for researchers.

As a National Environmental Research Park we have special links to other DOE Research Parks, like Savannah River. We are also an international biosphere reserve and a unit of the Southern Appalachian Biosphere Reserve- providing an impressive network for interactions.

They say there are three kinds of people—those who can count, and those who cannot.

The more I think about it, though, the more I'm convinced that there is really a third kind of person. Those who know things should count that don't. Most of us probably fall into this category. We know that the significance of a population, community, or ecosystem is greater than its individual components.

Places like Oak Ridge. Places that are greater than the sum of their parts.

For more information about the Oak Ridge Reservation, check the website at: <http://www.esd.ornl.gov/facilities/nerp/>.

To be included on the mailing list for the informal, electronic Park Notes newsletter, send an e-mail to Pat Parr at parrpd@ornl.gov.

Pat Parr is the Oak Ridge National Laboratory Area Manager. She has been responsible for various aspects of land management on the Department of Energy's Oak Ridge Reservation since 1984. Current responsibilities include land use planning, natural resource management, and management of the National Environmental Research Park which is also a Biosphere Reserve.

Pat is Past President of the Association of Southeastern Biologists, a member of the Executive Committee for the Southern Appalachian Man and Biosphere Cooperative, and a Board Member of the Tennessee Exotic Pest Plant Council. She is a member of the 2001 Loudon County Tennessee Leadership class and serves as International Service Director for the Oak Ridge Rotary Breakfast Club.



Pat Parr Delivers the Past President's address at the banquet.



The Melton Valley area of the Oak Ridge Reservation



Bird watching on the Oak Ridge Reservation led by Jim Evans
of the Tennessee Wildlife Resources Agency.



Old Homestead on the Oak Ridge Reservation.

SYMPOSIUM

Lower Mississippi River and Coastal Louisiana: challenges of the past and present, opportunities for the future

Organizers: HENRY L. BART, JR.,
Department of Ecology & Evolutionary Biology, Tulane University

DAVID A. WHITE
Department of Biological Sciences, Loyola University

A half-day symposium on the lower Mississippi River and coastal Louisiana was held on Thursday, April 5, 2001, in Audubon Suites E of the Radisson Hotel in Downtown New Orleans. The symposium featured brief introductory remarks by the symposium organizers and six invited talks by prominent researchers from Louisiana institutions. The following is a summary of the symposium.

Introductory Remarks

HENRY L. BART, JR., Department of Ecology and Evolutionary Biology
Tulane University, New Orleans, LA 70118

The Mississippi River Basin drains 41 percent of the coterminous United States and receives discharges and runoff over this entire area from industry, municipal sewage treatment facilities, and agricultural lands. Nowhere is the assault on river water-quality greater than in the final 300 miles of the river in Louisiana. Here, over 350 industrial and municipal facilities are situated along the river. Roughly 175 of these facilities discharge wastewater into the river. The 130 miles of river between Baton Rouge and New Orleans—the so-called “industrial corridor”—is an area of concentrated industrial activity, with 126 petrochemical plants and seven oil refineries. In 1999, toxic chemical discharges into this stretch of the river amounted to roughly 50 million pounds.

Industrial and municipal discharges to the lower Mississippi River are affecting water quality. Concern over certain classes of organic contaminants found in industrial and municipal discharges (plasticizers and common industrial and household surfactants) is heightened because they have been shown to mimic steroid hormones (e.g., estrogen), disrupting sexual and other hormone-related development in vertebrates at very low concentrations. Effluents discharged into the river from municipal sewage treatment facilities contain residues of estrogen, pharmaceuticals we take, and even caffeine from the coffee we drink. Discharges from the many municipal sewage treatment plants have been also implicated in the high fecal coliform counts recently recorded in lower reaches of the river. Though a natural component of the intestinal flora of humans and others animals, coliform bacteria contaminate the flesh of fish and shellfish and render water bodies unfit for human recreational contact.

Nutrients, originating as fertilizer applied to croplands of the upper Midwest, are causing excessive algal blooms in the Gulf of Mexico. As the algae sink and die, they rob the gulf waters of oxygen, affecting fish and shellfish on the sea floor. Some of the algae are toxic and pose direct health threats to marine life and humans in coastal Louisiana.

Historically, the lower Mississippi River has followed different routes to the Gulf of Mexico, breaching its levees at times of high flow, switching from one delta lobe to another, and building most of land along the coast of Louisiana. This natural process of delta formation has been virtually halted by a long history of levee heightening and river modification that has forced the river to remain within its banks and follow a fixed course. As a consequence, coastal marshes vital to the natural and cultural heritage of southern Louisiana are subsiding and being reclaimed by the Gulf of Mexico at an alarming pace.

Despite its many environmental problems, the Mississippi River presents the only hope for reversing the severe problem of coastal land loss in Louisiana. The sediments, fresh water, and nutrients that are currently being delivered to deep waters of the Gulf of Mexico can be beneficially diverted to subsiding marshlands. The complex interactions of contaminants, nutrients, sediment, freshwater, and biota in the lower Mississippi River present interesting challenges for scientists exploring ways of using the river for coastal restoration.

Introductory remarks (cont'd): Scales of landscape and the Mississippi River

DAVID A. WHITE

Department of Biological Sciences, Loyola University, New Orleans, LA 70118

Peruse any of the earliest maps of North America or the United States encompassing the entire drainage of the Mississippi River and at this largest scale be reminded of how crude the mapping ability was at this time. At a landscape scale considerably smaller than the entire drainage of the River is the land of the Coastal Plain of Louisiana with its myriad of shallow bays and waterways. There are three more scales of landscape within the State of Louisiana that are telling: the eastern portion of the Coastal Plain called the Deltaic Plain, the actual "birdfoot" Delta, and the scale of what geologists call a "splay" within the interior of the Delta. All three of these landscapes are a direct result of the Mississippi River, from its hydrology over the ages impacting the geology of the landscape. The history of each is the same story of land building and subsequent land loss, relevant to this symposium. The Delta Plain formed over the past 5000+ years by the shifting of the very mouth of the Mississippi River to at least five locations which resulted in the deposition of sediment over a wide area creating the coast of the State. The mouth of the River moved to its current position at the very edge of the continental shelf about 500 yrs bp. At the scale of the current delta, one tends to imagine that the reason the "birdfoot delta" image so familiar to us today was not a part of the oldest maps was because the cartographers had little technology. Actually, the present delta looked nothing like it did just 200 years ago. At the scale of the birdfoot delta,

shifting of river flow with its accompanying sediment, built the land between the major passes from breeches in the natural levees near the former mouth. The current delta was created with its maximum land area in the early to mid part of the 1900's. At this landscape scale, rapid decline in land coverage occurred from local rapid subsidence rates and lack of sediment reaching the interior marshes so that by the late 1970's wetland loss was of great concern in the birdfoot delta, as well as over larger areas of the State. The interior, extremely shallow ponds that formed are illustrative of a systematic problem across the Coastal Plain, wetland loss. This symposium is also about restoration of the State's wetlands. An example of the potential for wetland restoration can be seen at the scale of individual "splay" within the shallow ponds in interior of the Delta. These inner deltaic splays, infilling the former shallow ponds, are now models that managers have been looking towards duplicating for restoration efforts. This symposium will cover a variety of landscapes all influenced greatly by the Mississippi River.

Seasonal storage of sediments and carbon cycling the lower Mississippi River

THOMAS BIANCHI (presenter)

S. MARTHA SUTULA

Department of Ecology and Evolution, Institute for Earth and Ecosystem Sciences, Tulane University, New Orleans, LA 70118

BRENT A. MCKEE

Department of Geology, Institute for Earth and Ecosystem Sciences, Tulane University, New Orleans, LA 70118.

Presently, only about 10% of the sediments eroded from land are being discharged directly to the oceans by rivers, while the bulk of particulate terrestrial materials is being stored somewhere within the river system--between the uplands and the sea. Seasonal sediment storage and remobilization have been documented in rivers where deposition to the riverbed occurs during low discharge and resuspension during high discharge. We examined transformations and sources of suspended and bottom sediment carbon in the lower Mississippi River as a result of seasonal changes in discharge, storage, and diagenesis. Samples were collected during five cruises over one year at two sites in the lower river. No strong variation in concentrations of carbon from surface to bottom, or along the longitudinal axis of river were observed. Seasonal changes in dissolved organic carbon (DOC) porewater profiles are consistent with diagenesis occurring during low-flow storage after period of high-flow deposition. Particulate organic carbon (POC) showed significantly greater range in concentrations than DOC. Based on lignin-phenols, much of the terrestrially-derived POC that settled to these sediments was derived from non-woody and woody angiosperms. Conversely, based on plant pigment composition, much of the phytoplankton-derived POC was from diatoms.

Hypoxia in the Gulf of Mexico and Linkages with the Mississippi River

NANCY N. RABALAIS

Louisiana Universities Marine Consortium, Chauvin, LA 70344.

A large zone of oxygen-depleted water extends across the Louisiana continental shelf and on to the Texas coast most summers. The Gulf of Mexico hypoxic zone is the largest such zone in coastal waters of the Western Hemisphere, reaching up to 20,000 km² in mid-summer. Hypoxia occurs from late February through early October and nearly continuously from mid-May through mid-September. Hypoxic waters can include 20 to 80% of the water profile between 5 and 30 m water depth, and can extend as far as 130 km offshore. Gulf hypoxia results from the stratification of marine waters due to Mississippi River system freshwater inflow and the decomposition of organic matter stimulated by Mississippi River nutrients. Strong empirical relationships are evident for hypoxia versus river discharge and nutrient flux with time and spatial lags. Hypoxia was first recorded on the continental shelf of the northern Gulf of Mexico in the early 1970s. Prior to the 1970s, there is only scattered anecdotal data. Analysis of the sediment record, however, shows that severe hypoxia is a recent development in Gulf waters and coincident with the tripling of nitrogen flux from the Mississippi River.

Harmful algal blooms in Louisiana coastal waters: a result of eutrophication and a threat to human and ecosystem health

QUAY DORTCH

Louisiana Universities Marine Consortium, 8124 Highway 56, Cocodrie, LA 70344

A wide variety of Harmful Algal Blooms (HABs) occur in Louisiana coastal waters with impacts that may include 1) human illness due to consumption of contaminated fish and shellfish or exposure to toxins by other mechanisms, 2) mortality of fish, shellfish, and other wildlife, 3) ecosystems changes due to altered species composition, and 4) aesthetic problems with the appearance, smell, and taste of water. Nutrient inputs have increased substantially to both estuaries and the continental shelf, especially due to changes in the Mississippi River since the 1950's. While it is not possible to determine the role of increased nutrients in the occurrence of some HABS, the two most pervasive and persistent HABs in this region, *Pseudo-nitzschia* spp. and *Anabena* spp., are directly stimulated by inputs of high nutrient Mississippi River water. *Anabena* spp. cause discoloration of water and foul odors over wide areas in low salinity regions and sometimes produce hepatotoxins. *Pseudo-nitzschia* spp. can produce domoic acid, a neurotoxin, and are a dominant species at higher salinities in estuaries and on the shelf. There is some concern that when Mississippi River water is used in freshwater diversions for wetland restoration, blooms of these species may increase.

Characterization, degradation, and restoration of the Mississippi River alluvial plain

GARY P. SHAFFER (presenter)

Department of Biological Sciences, Southeastern Louisiana University,
Hammond, LA 70402

JAMES. G. GOSSELINK

Center for Wetlands Resources, Louisiana State University, Baton Rouge, LA
70803

The Mississippi River Alluvial Plain originates in southern Illinois and extends over 1000 km through Missouri, Kentucky, Tennessee, Arkansas, Mississippi, and Louisiana. The floodplain historically supported the largest expanse of forested wetlands in the USA, approximately 8.6 million ha, 80% of which has been converted primarily to production of cotton, corn, and soybeans. Over 95% of the remaining floodplain wetlands are located in Louisiana. During the last decade, The Nature Conservancy has spearheaded a restoration program that (1) brought together a network of partners, including state and federal agencies, private landowners, conservation groups, academicians, and other interested citizens; (2) developed a geographic information system for the entire floodplain; and (3) for one watershed, the Tensas basin in northeastern Louisiana, constructed a high-resolution GIS to demonstrate the feasibility of a semi-objective, landscape-scale restoration planning procedure, including methodology for prioritization of existing wetland forest patches and areas most suitable for reforestation and connection via corridors. Additional strategies involve restoration of the natural hydrologic regime in key areas, development of secondary buffer zones around core conservation areas, and management of uplands essential to watershed functions. To date, over 200,000 ha of marginal agricultural land has been replanted as forested wetland.

Using the Mississippi to Restore Coastal Louisiana: the greatest opportunity and the greatest challenge

DENISE J. REED

Department of Geology & Geophysics, University of New Orleans, New Orleans,
LA 70148

Decades of research on the underlying causes of coastal land loss in Louisiana have led to a new concerted effort to utilize the resources presented by the Mississippi to the maximum extent practicable. A sustainable deltaic plain, with all the associated ecosystem goods and services, must be connected to the river. However, infrastructure development, as well as human expectations of the renewable resource base, mean that re-establishing such connections is both a costly and difficult process which results in changes that, although making the ecosystem more sustainable, are not always what people want or expect. The Coast 2050 plan for Louisiana calls for the diversion and management of Mississippi River water on an unprecedented scale. While ongoing planning efforts have resolved, or at least elucidated, many of the physical and economic

obstacles to river diversions (e.g., increased dredging costs and the need for an integrated 'oyster relocation' program), substantial debate surrounds ecological implications and the effect on other harvestable species. The trade-off facing planners and policy-makers in coastal Louisiana is whether to wait for better resolution of technical issues while allowing continuing degradation of the system, or to move on in an adaptive management context knowing that controversy lies ahead.

Developing Conceptual Models of Coastal Wetland Restoration in River Dominated Environments

ROBERT R. TWILLEY

VICTOR RIVERA-MONROY (*presenter*)

Center for Ecology and Environmental Technology, University of Louisiana at Lafayette, Lafayette, LA 70504

Restoration ecology is predicated on understanding how physical and biological factors control succession of ecosystems. A fundamental need of restoration ecology is general systems theory leading to development of protocols that can be used to diagnose problems and prescribe specific site criteria to design a rehabilitated ecosystem. Approaches to coastal wetland rehabilitation lack conceptual and simulation models that couple the relative influence of geomorphological and ecological factors that control successional trajectories. River dominated wetlands are strongly influenced by geophysical processes; whereas many models of plant succession are based mainly on ecological processes. Destabilization of marsh sediments in deltaic environments has been historically related to chronic waterlogging stress and lack of riverine sediments. Yet marsh damage during the recent severe drought in the Mississippi River delta suggests that water deficits can also destabilize inland marsh habitats. Thus the relative role of freshwater and sediments is confusing. Coastal wetland succession is described using freshwater diversion projects as a method to reverse wetland loss in this deltaic environmental setting. Levees and dams have been instrumental in the decline of floodplain wetlands in many river-dominated coastal areas around the world. Operational standards for freshwater diversion structures require improved models of coastal wetland succession to mitigate against potential problems with downstream eutrophication. Pulsed geophysical events that deliver sediment can be used to provide successional trajectories of wetland processes. Models of coastal wetland succession must couple geophysical, hydrographic, and biogeochemical processes to assist in the design of rehabilitation projects in deltaic environments.



Aerial view of the Mississippi River study area related to the symposium.



Whit Gibbons and Hank Bart. Hank co-organized the Mississippi River symposium with David White.



Niki Nicholas, President of the SE Chapter of the ESA addresses the Silver Anniversary luncheon audience.



SE Chapter of the ESA Silver Anniversary luncheon attendees.

**ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
TREASURER'S REPORT 1 JANUARY – 31 DECEMBER 2000**

I. BEGINNING BALANCE	\$66,197
II. RECEIPTS	
Regular Dues	16,625
Patron Dues	4,500
Meeting Revenue	0
Enrichment Fund	230
Sales	350
Interest	4,274
Royalties	0
Society of Wetland Scientists, South Atlantic Chapter	500
Carolina Biological Supply Co., Teaching Award	1,000
Carolina Biological Contribution	3,600
WILDCO Aquatic Biology Award	200
TOTAL RECEIPTS	\$31,279
III. TOTAL RECEIPTS AND BEGINNING BALANCE	\$97,476
IV. DISBURSEMENTS	
1. Dues Notice	0
2. Publications	
ASB Bulletin 46(3)	3,323
ASB Bulletin 46(4)	4,005
ASB Bulletin 47(1)	1,627
ASB Bulletin 47(2)	10,195
ASB Bulletin 47(3)	4,552
ASB Bulletin 47(4)	0
Misc. Publications	147
Total Publications	23,849
3. Office Expenses	257
4. Official Travel	563
5. Awards and Honoraria	
Graduate Student Support Grants	4,116
Speaker Honorarium	1,000
Speaker Travel	224
WILDCO Aquatic Biology Award	200
ASB Research Awards	1,200
Certificates/Plaques	233
ASB Poster Award	300
Carolina Biological Teaching Award	1,000
Outstanding Science Teachers	500
Total Awards	8,773
6. Interim Meeting	467
7. Miscellaneous	
Affiliations	200
Local Committee	1,963
Symposia, Workshops	1,292
Bank Charges	144
Web Site	0

7. Miscellaneous (continued)		
NSF 50 th Anniversary	50	
Searchable On-line Directory	600	
Total Miscellaneous	4,249	
TOTAL DISBURSEMENTS		\$38,158
V. ENDING BALANCE		\$59,318
VI. NET CHANGE FOR 2000		(-\$6,879)

**ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
ENRICHMENT FUND 1 JANUARY – 31 DECEMBER 2000**

I.	BEGINNING BALANCE	\$31,787
II.	RECEIPTS	
1. Gifts	130	
2. Interest	1,839	
TOTAL RECEIPTS		1,969
III.	TOTAL RECEIPTS AND BEGINNING BALANCE	\$33,756
IV.	TOTAL DISBURSEMENTS	0
V.	ENDING BALANCE	\$33,756
VI.	NET CHANGE FOR 2000	\$1,969

**CASH ON HAND
31 DECEMBER 2000**

I.	MERRILL LYNCH	\$65,438
II.	WACHOVIA	\$7,953
	TOTAL	\$73,391

**ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
BUDGET 2000 ON 31 DECEMBER 2000**

I.	RECEIPTS	Budget	Actual	Difference
	Regular Dues	17,050	16,625	(425)
	Patron Dues	2,000	4,500	2,500
	Interest	1,500	4,274	2,774
	Meeting Revenue:			
	Exhibits	3,000	0	(3,000)
	Sales	250	350	100
	Registration	7,400	0	(7,400)
	Carolina Biological Supply Company			
	Teaching Award	1,000	1,000	0
	Society of Wetland Scientists, South Atlantic Chapter	500	500	0

Enrichment	0	230	230
Carolina Biological Contribution	0	3,600	3,600
WILDCO Aquatic Biology Award	0	200	200
TOTAL RECEIPTS	\$32,700	\$31,279	(\$1,421)

II. DISBURSEMENTS

1. Dues Notice	500	0	500
Dues Notice Totals	500	0	500
2. Publications			
ASB Bulletin 46(3)	0	3,323	(3,323)
ASB Bulletin 46(4)	0	4,005	(4,005)
ASB Bulletin 47(1)	3,000	1,627	1,373
ASB Bulletin 47(2)	8,000	10,195	(2,195)
ASB Bulletin 47(3)	3,500	4,552	(1,052)
ASB Bulletin 47(4)	3,000	0	3,000
Misc. Publications	500	147	353
Publications Total	18,000	23,849	(5,849)
3. Office Expenses	500	257	243
Office Expenses Total	500	257	243
4. Official Travel	1,500	563	937
Official Travel Total	1,500	563	937
5. Awards and Honoraria			
Grad. Student Support Grants	4,100	4,116	(16)
Aquatic Biology Award	200	200	200
Speaker Honorarium	1,000	1,000	1,000
Speaker Travel	1,000	224	776
Research Awards	1,200	1,200	0
Certificates/Plaques	300	233	67
Poster Award	300	300	0
Carolina Biol. Teaching Award	1,000	1,000	0
Outstanding Teacher	0	500	(500)
Awards/Honor Total	9,100	8,773	327
6. Interim Meeting	0	467	(467)
Interim Meeting Total	0	467	(467)
7. Miscellaneous			
Affiliations	400	200	200
Local Committee	500	1,963	(1,463)
Symposia, Workshops	1,900	1,292	608
Bank Charges	200	144	56
Web Site	100	0	100
NSF 50 th Anniversary	0	50	(50)
Searchable On-line Directory	0	600	(600)
Miscellaneous Total	3,100	4,249	(1,149)
TOTAL DISBURSEMENTS	\$32,700	\$38,158	(\$5,458)

III. BALANCE	\$0	(\$6,879)	(\$6,879)
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ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
2002 PROPOSED BUDGET

I.	BEGINNING BALANCE	\$0
II.	RECEIPTS	
	Regular Dues	23,000
	Patron Dues	3,500
	Interest	4,000
	Meeting Revenue	5,000
	Carolina Biological Supply Co. Teaching Award	1,500
	Martin Microscope Student Research Award	600
	WILDCO Aquatic Biology Award	200
	TOTAL RECEIPTS	\$37,800
III.	TOTAL RECEIPTS AND BEGINNING BALANCE	\$37,800
IV.	DISBURSEMENTS	
1.	Dues Notice	0
2.	Publication	
	ASB Bulletin 49(1)	3,000
	ASB Bulletin 49(2)	8,000
	ASB Bulletin 49(3)	3,500
	ASB Bulletin 49(4)	3,000
	Total Publication	17,500
3.	Office Expenses	300
4.	Official Travel	1,500
5.	Awards and Honoraria	
	Graduate Student Support	7,500
	Aquatic Biology Award	200
	Speaker Honorarium	1,000
	Speaker Travel	1,000
	Research Awards	1,200
	Certificates/Plaques	300
	Poster Award	300
	Carolina Biol. Teaching Award	1,500
	Outstanding Teachers	1,000
	Total Awards and Honoraria	14,000
6.	Interim Meeting	500
7.	Liability Insurance	550
8.	Miscellaneous	
	Affiliations	200
	Local Committee	500
	Symposia, Workshops	2,000
	Bank Charges	250
	Web Site	500
	Total Miscellaneous	3,450
	TOTAL DISBURSEMENTS	\$37,800
V.	NET BALANCE FOR YEAR	\$0
VI.	ENDING BALANCE	\$0

ASSOCIATION OF SOUTHEASTERN BIOLOGISTS
2001 BUDGET ON 4 APRIL 2001

I. RECEIPTS		Budget	Actual	Difference
Regular Dues		18,000	16,397	(1,603)
Patron Dues		2,500	0	(2,500)
Interest		4,000	654	(3,346)
Meeting Revenue		5,000	0	(5,000)
Carolina Biological Supply Company				
Teaching Award		1,500	0	(1,500)
Martin Microscope Student				
Research Award		600	0	(600)
WILDCO Aquatic Biology Award		200	0	(200)
Enrichment		0	1,460	1,460
TOTAL RECEIPTS		\$31,800	\$18,511	(\$13,289)
II. DISBURSEMENTS				
1. Dues Notice		0	0	0
2. Publications				
ASB Bulletin 47(4)		0	2,359	(2,359)
ASB Bulletin 48(1)		3,000	2,196	804
ASB Bulletin 48(2)		8,000	0	8,000
ASB Bulletin 48(3)		3,500	0	3,500
ASB Bulletin 48(4)		3,000	0	3,000
3. Office Expenses		300	0	300
4. Official Travel		1,500	410	1,090
5. Awards and Honoraria				
Grad. Student Support Grants	7,500	7,329	171	
Aquatic Biology Award	200	0	200	
Speaker Honorarium	1,000	0	1,000	
Speaker Travel	1,000	0	1,000	
Research Awards	1,200	0	1,200	
Certificates/Plaques	300	0	300	
Poster Award	300	0	300	
Carolina Biol. Teaching Award	1,500	0	1,500	
6. Interim Meeting	500	0	500	
7. Miscellaneous				
Affiliations	200	200	0	
Local Committee	500	0	500	
Symposia, Workshops	2,000	0	2,000	
Bank Charges	250	77	173	
Web Site	500	0	500	
Liability Insurance	0	550	(550)	
TOTAL DISBURSEMENTS	\$36,250	\$13,121	\$23,129	
III. BALANCE		(\$4,450)	\$5,390	\$9,840

**ASB Officers, Committees and Representatives and
SOUTHEASTERN BIOLOGY STAFF, 2001-2002**

Telephone numbers, FAX numbers and e-mail addresses can be found
on the inside front cover of each issue of the *Southeastern Biology*.

Southeastern Biology Staff

Print Editor	James D. Caponetti, Department of Botany, University of Tennessee, Knoxville, TN
Associate Editor	Terry Richardson, Department of Biology, University of North Alabama, Florence, AL
Web Editor	Howard Neufeld, Department of Biology, Appalachian State University, Boone, NC
Business Manager	Tim Atkinson, Carolina Biological Supply Company, Burlington, NC
News Editor	Jon Fortman, Division of Science and Math, Mississippi University for Women, Columbus, MS
Book Review Editor	James Ross, Cumberland College, Williamsburg, KY

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President-elect	J. Kenneth Shull, Department of Biology, Appalachian State University, Boone, NC
Vice-President	Douglas A. Rayner, Department of Biology, Wofford College, Spartanburg, SC
Past President	Howard Neufeld, Department of Biology, Appalachian State University, Boone, NC
Secretary	Terry Richardson, Department of Biology, University of North Alabama, Florence, AL
Treasurer	Tim Atkinson, Carolina Biological Supply Company, Burlington, NC
Membership Officer	Deborah Atkinson, School of Public Health, University of North Carolina, Chapel Hill, NC
Archivist	John Herr, Department of Biological Sciences, University of South Carolina, Columbia, SC

Executive Committee Members-at-Large

- 2002: Gerhard Kalmus, Dept. of Biology, East Carolina Univ., Greenville, NC
Bonnie Kelley, Dept. of Biology, Univ. of North Carolina, Pembroke, NC
- 2003: Henry Bart, Tulane Museum of Natural History, Belle Chasse, LA
Kim Marie Tolson, Dept. of Biology, Univ. of Louisiana, Monroe, LA
- 2004: W. Michael Dennis, Breedlove, Dennis and Associates, 330 W. Canton Avenue, Winter Park, FL
Rebecca Cook, Dept. of Biology, Lambuth Univ., Jackson, TN

ASB Committee List for 2001-2002

Representatives to Other Societies

AAAS - American Association for the Advancement of Science

Representative: Bonnie Kelley, Department of Biology, UNC Pembroke, One University Drive, P. O. Box 1510, Pembroke NC 28372-1510; Kelley@nat.uncp.edu.

ASC - Association of Systematic Collections

Representative: Nancy Coile, FDACS - Division of Plant Industry, P. O. Box 147100, Gainesville, FL 32614-7100; coilen@doacs.state.fl.us.

AIBS - American Institute of Biological Sciences

Current Representative: Geraldine Twitty, Department of Biology, Howard University, 415 College St., NW, Washington, DC 20059; (202) 806-6953; gtwitty@fac.howard.edu.

Committees

Auditing Committee

New Chair: Gerhard Kalmus, Dept. of Biol., East Carolina University, Greenville, NC 28785; (919) 328-6306, FAX (252) 328-4178; bikalmus@ecuvm.cis.ecu.edu.

2nd Year Member: Andy Ash, Department of Biology, UNC Pembroke, One University Drive, P.O. Box 1510, Pembroke, NC 28372-1510; (910) 521-6418, FAX (252) 328-4178; aash@nat.uncp.edu.

3rd Year Member: Bonnie Kelley, Department of Biology, UNC Pembroke, One University Drive, P.O. Box 1510, Pembroke, NC 28372-1510; Kelley@nat.uncp.edu.

Committee on Women, Minorities and the Disabled

New Chair: Irene Kokkala, Department of Biology, North Georgia College and State University, Dahlonega, GA 3059; (706) 864-1368; ikokkala@ngcsu.edu. Chair in 2001.

2nd Year Member: Lonnette Edwards, USDA Forest Service-Southern Research Station, P.O. Box 1387, Normal, AL 35762; (256) 858-4233 or 4201, FAX (256) 858-8275; ledwards@fs.fed.us. Chair in 2002.

New Member: Karen L. McGlothlin, Department of Biological Sciences, The University of the South, Sewanee, TN, 37383-1000; kmcgloth@sewanee.edu.

Conservation Committee

New Chair: Virginia Tolbert, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-1059; (423) 574-7288; vrt@ornl.gov.

2nd Year Member: Katie Greenberg, 2 Brook Forest Dr., Arden, NC 28704; kgreenberg@fs.fed.us

New Member: Drew Lanham, Forest Resources, 261 Lehotsky Hall, Clemson University, Clemson, SC 29634-1003; lanhamj@clemson.edu.

Education Committee

New Co-Chairs: Barbara Rafaill, Georgetown College, 400 E. College St, Biology Department, Georgetown, KY 40324; (502) 863-8085; brafaill@georgetowncollege.edu. Co-Chair in 2001. Don Hauber, Department of Biological Sciences, Loyola University, New Orleans, LA 70118; (504) 865-2769; hauber@loyno.edu. Co-Chair in 2001.

2nd Year Members Debbie Moore, Department of Natural Sciences, P.O. Box 8368, Dothan, AL 36304; (334) 983-6556 ext. 250, FAX (334) 983-6322; dmoore@tsud.edu. Co-chair in 2002.
Brian Odom, odom@wingate.edu. Co-chair in 2002.

New Members: Dr. Jennifer Davis, Shorter College, Rome GA; (706) 233-7292; jdavis@shorter.edu. Catherine Newsome, Campus Box 2625, Elon College, NC 27244; (336) 278-6193; newsome@elon.edu.

Enrichment Fund Board

Chair: Kim Marie Tolson, Department of Biology, University of Louisiana at Monroe, Monroe, LA 71209-0520; (318) 342-1805; FAX (318) 342-3312; bitolson@ulm.edu.

Finance Committee

Chair: Tim Atkinson, Carolina Biological Supply Co., 2700 York Rd., Burlington, NC 27215; (336) 538-6224, FAX (800) 222-7112; tatkinson@carolina.com.

Members: Howard Neufeld, Department of Biology, P. O. Box 32027, Appalachian State University, Boone, NC 28608-2027; (828) 262-2683; FAX (828) 262-2127; Neufeldhs@appstate.edu.

President Elect: J. Kenneth Shull, Department of Biology, P. O. 32027, Appalachian State University, Boone, NC 28608-2027; (828) 262-2675; shulljk@appstate.edu.

Executive Committee: W. Michael Dennis, Breedlove, Dennis and Associates, Inc., 330 W. Canton Avenue Winter Park, FL 32789; (407) 677-1882, FAX (407) 657-7008; Mike@bda-inc.com. Is Vice-Chair until 2003.

Graduate Student Support Award Committee

New Chair: Isaure de Buron, Department of Biology, College of Charleston, 50 Coming St., Charleston, SC 29424; (843) 953-5696, FAX (843) 953-5453; deburon@cofc.edu.

2nd Year Member: Werner Wieland, Dept. of Biological Sciences, Mary Washington College, Fredericksburg, VA 22401; (540) 654-1426, FAX (540) 654-1081; wwieland@mwc.edu.

New Member: Zack Murrell, Department of Biology, P. O. Box 32027, Appalachian State University, Boone, NC 28608-2027; (828) 262-2683; FAX (828) 262-2127; murrellze@appstate.edu.

Meritorious Teaching Award Committee

New Chair: Rebecca Cook, Biology Department, Lambuth College, Lambuth Blvd., Jackson, TN 38301; (901) 425-3278, FAX (901) 988-4900; cook-reb@lambuth.edu. Chair in 2001.

2nd Year Member: Diane Nelson. Department of Biological Sciences, East Tennessee State University, P. O. Box 70703, Johnson City, TN 37614-0703; (423) 439-4376, FAX (423) 439-5958; nelsond@etsu.edu. Chair in 2002.

New Member: Tom Wentworth, Box 7612 Botany Department, NC State University, Raleigh, NC 27695-7612; tom_wentworth@ncsu.edu.

Nominating Committee

New Chair: Pat Parr, P. O. Box 2008, Oak Ridge National Laboratory, Oak Ridge, TN 37830-6038; (865) 576-8123, FAX (865) 576-8646; par@ornl.gov.

New Member: Joe Winstead, Department of Biology, Southern Arkansas University, 100 East University, Magnolia, AR 71753-5000; (870) 235-4290; jewinstead@saumag.edu.

New Member: Ken Marion, Department of Biology, University of Alabama, Birmingham, AL 35294; (205) 934-3582; kmarion@uab.edu.

Past-President's Council

New Chair: Howard Neufeld, Department of Biology, P. O. Box 32027, Appalachian State University, Boone, NC 28608-2027; (828) 262-2683; FAX (828) 262-2127; Neufeldhs@appstate.edu.

New Members: all past presidents.

Patron Member and Exhibitor Committee

New Chair: Doug Rayner, raynerda@wofford.edu. Chair until 2003.

Vice-Chair: W. Michael Dennis, Breedlove, Dennis and Associates, Inc., 330 W. Canton Avenue Winter Park, FL 32789; (407) 677-1882, FAX (407) 657-7008; Mike@bda-inc.com. Vice-Chair until 2003.

3rd Member: Gerhard Kalmus, Dept. of Biol., East Carolina University, Greenville, NC 28785; (919) 328-6306, FAX (252) 328-4178; bikalmus@ecuvm.cis.ecu.edu.

4th Member: Hank Bart, Tulane Museum of Natural History, Belle Chasse, LA 70037; (504) 394-1771, FAX (504) 394-5045; hank@museum.tulane.edu.

Place of Meeting Committee

New Chair: Robert George, Biological Sciences, 601 South College Rd., University of North Carolina at Wilmington, Wilmington, NC 28403-3297; (910) 962-3487; georger@uncwil.edu. Chair in 2001.

2nd Year Member: Mark Schorr, mark-schorr@utc.edu. Chair in 2002.

New Member: Hank Bart, Tulane Museum of Natural History, Belle Chasse, LA 70037; (504) 394-1771, FAX (504) 394-5045; hank@museum.tulane.edu. Chair in 2003.

Poster Awards Committee

New Chair: Steve Baker, Department of Biology, Oxford College of Emory University, Oxford, GA, 30054; (770) 784-8446, FAX (770) 784-8423; sbaker@emory.edu.

2nd Year Members: Kathy Hornberger, hornberger@_popl.science.widener.edu.

Rick Duffield, Dept. of Biology, Howard University, Washington, DC 20059; (202) 806-6127, FAX (202) 806-4564; rduffield@fac.howard.edu.

Dennis Haney, Dept. of Biology, Furman University, Greenville, SC 29613; (864) 294-2050; dennis.haney@furman.edu.

New Member: Victoria Turgeon, Furman University, 3300 Poinsett Highway, Greenville, SC 29613; (864) 294-3791; Victoria.turgeon@furman.edu.

Publications Committee

New Chair: Bonnie Kelley, Biology Department, University of North Carolina at Pembroke, Pembroke, NC 28372; (910) 521-6419, FAX (252) 328-4178; kelley@nat.uncp.edu.

Bulletin Editor: Jim Caponetti, Dept of Botany, 437 Hesler Hall, University of Tennessee, Knoxville, TN 37996-1100; (865) 974-6219 (his office), (865) 974-2256 (botany office), FAX (865) 974-2258; jcaponet@utk.edu.

2nd Year Member: Joe Pollard, Dept. of Biol., Furman University, Greenville, SC 29613-0418; (864) 294-3249, FAX (864) 294-2058; pollard@furman.edu.

New Member: Rebecca Cook, Biology Department, Lambuth College, Lambuth Blvd., Jackson, TN 38301; (901) 425-3278, FAX (901) 988-4900; cook-reb@lambuth.edu.

Research Awards Committee - Senior

New Chair: John Herr, Department of Biological Sciences, University of South Carolina, Columbia, SC 29208; (803) 777-8110, FAX (803) 777-4002; herr@biol.sc.edu.

2nd Year Member: Dwayne Wise, Department of Biology, P.O. Drawer GY, Mississippi State University, Mississippi State, MS, 39762; (601) 325-7579, FAX (662) 325-7939; dawl@ra.msstate.edu. Chair in 2002.

New Member: Cliff Hupp; USGS, 430 National Center, Reston, VA 20192; (703) 648-5207; crhupp@usgs.gov.

Research Awards Committee - Student

New Chair: Member: Richard N. Henson, College of Arts & Sciences, P.O. Box 32021, 2102 I.G. Greer Hall, Appalachian State University, Boone, NC 28608-2021; (828) 262-3078, FAX (828) 262-2127; hensonrn@appstate.edu. Chair in 2001.

2nd Year Member: Ray Petersen, Dept. of Biology, Howard University, Washington, DC 20059; (202) 806-6943, FAX (202) 806-4564; rpetersen@fac.howard.edu. Chair in 2002.

New Member: L. J. Davenport, Department of Biology, Samford University, Birmingham, AL 35229; (205) 870-2584, FAX: (205) 870-2479; ljdavenp@samford.edu.

Resolutions Committee

New Chair: Howard Neufeld, Department of Biology, P. O. Box 32027, Appalachian State University, Boone, NC 28608-2027; (828) 262-2683, FAX (828) 262-2127; Neufeldhs@appstate.edu.

New Member: Richard N. Henson, College of Arts & Sciences, P.O. Box 32021, 2102 I.G. Greer Hall, Appalachian State University, Boone, NC 28608-2021; (828) 262-3078, FAX (828) 262-2127; hensonrn@appstate.edu.

New Member: Virginia Tolbert, Oak Ridge National Laboratory, P.O. Box 2008, Oak Ridge, TN 37831-1059; (423) 574-7288; vrt@ornl.gov.



Barn owl on the Oak Ridge Reservation.

2002 MEETING OF THE ASSOCIATION**CALL FOR PAPERS****THE 63RD ANNUAL MEETING****HOST: APPALACHIAN STATE UNIVERSITY****MEETING SITE: BROYHILL INN AND CONFERENCE
CENTER, APPALACHIAN STATE UNIVERSITY
BOONE, NORTH CAROLINA 28608****DATE: APRIL 10-13, 2002**

Please note the following deadlines which are to be met before our 63rd Annual Meeting hosted by Appalachian State University in Boone, NC.

16 November Titles and abstracts of papers and posters (use electronic submission format described below). They must reach the program chairman by this date.

19 October Nominations for ASB officers and executive committee.

16 November-

11 January Submissions for research awards.

18 January Application for student travel awards.

MEETING WEBSITE

Meeting Website is - <http://www.asb.appstate.edu/asb2002.htm>

**LOCAL COMMITTEE ASSIGNMENTS
FOR THE 63RD ANNUAL MEETING
APPALACHIAN STATE UNIVERSITY
BOONE, NC 28608**

Addresses for all committee members are: Department of Biology, Appalachian State University, Boone, NC 28608. FAX number for all members is 828-262-2127.

Local Arrangements Chair:	Howie Neufeld E-mail: neufeldhs@appstate.edu	Tel: 828-262-2683
Program Chair:	Ken Shull E-mail: shulljk@appstate.edu	Tel: 828-262-2675
Program Co-Chair:	Mary Connell E-mail: connellmu@appstate.edu	Tel: 828-262-2671
Program Co-Chair:	Skip Sedivec E-mail: sedivecmj@appstate.edu	Tel: 828-262-2679
Beta Beta Beta Coordinator:	Dru Henson E-mail: hensonda@appstate.edu	Tel: 828-262-2673
Commercial Exhibits:	Bill Dewel E-mail: dewelwc@appstate.edu	Tel: 828-262-2682/6908
Field Trips:	Zack Murrell E-mail: murrellze@appstate.edu	Tel: 828-262-2674
	Robert Creed E-mail: creedrp@appstate.edu	Tel: 828-262-6512
Posters and Audiovisuals:	Michael Windlespecht E-mail: windlspchtm@appstate.edu	Tel: 828-262-2680
	Bill Barber E-mail: barberwd@appstate.edu	Tel: 828-262-2865
	Max Dass E-mail: dasspm@appstate.edu	Tel: 828-262-6515
Registration, Meeting and Statistics:	Jan Johnson* E-mail: johnsonjw@appstate.edu	Tel: 828-262-2924

Social Arrangements: Gary Walker Tel: 828-262-2672
E-mail: walker@appstate.edu

Coleman McCleneghan Tel: 828-262-2681
E-mail: mccleneghanc@appstate.edu

Transportation Ray Williams Tel: 828-262-6511
and Volunteers: E-mail: williamsrs@appstate.edu

Matt Rowe Tel: 828-262-2676
E-mail: rowemp@appstate.edu

*Address for Jan Johnson: Director of Adult Programs, Office of Conferences and Institutes, Appalachian State University, Boone, NC 28608. Tel: 828-262-2924; E-mail: johnsonjw@appstate.edu.

**PAPER & POSTER SUBMISSION DOCUMENTS
FOR 2002 MEETING
DEADLINE: 16 November 2001**

Individuals presenting papers or posters are expected to be
members of ASB!

INSTRUCTIONS FOR SUBMITTING ABSTRACTS

Submit the following information and your abstract via e-mail to: asb@appstate.edu. The information in items 1-9 below and the abstract should be submitted as two separate attachments to a single e-mail message. If you do not have access to e-mail, or cannot attach documents to an e-mail, then mail your abstract and information to the program chair, Dr. Ken Shull, Department of Biology Appalachian State University, P.O. Box 32027, Boone, NC 28608-2027. They must reach the program chair by the deadline specified above.

Your attachments should be prepared in either Microsoft Word (Version 2000 or earlier) or WordPerfect (Version 8.0 or earlier). Convert all Macintosh documents to Word or WordPerfect for Windows before sending the attachments. Information must be received by November 16th for the title and abstract to appear in the April 2002 issue of *Southeastern Biology*. In the event of a last minute cancellation or other problem, please notify the Program Chair, Dr. Ken Shull, Department of Biology, Appalachian State University, Boone, NC 28608; Tel: 828-262-2675, FAX 828-262-2127, e-mail: shulljk@appstate.edu.

Please type the following information concerning your presentation and send it as an attachment to an e-mail message. An electronic copy is available on the meeting website (<http://www.asb.appstate.edu/asb2002.htm>) and can be downloaded. Provide the phone/fax numbers for the primary author. If you are submitting on behalf of another person, make sure you clearly indicate contact information for the primary author.

1. AUTHOR(s):

2. INSTITUTION(s):

3. 1st AUTHOR PHONE / FAX:

4. 1st AUTHOR E-MAIL:

5. TITLE:

6. PRESENTATION: Paper _____ Poster _____

7. PROJECTION EQUIPMENT:

35 mm slides _____ Overhead _____

Video Projector (for PowerPoint presentations)

Other (specify): _____

8. RECOMMENDED SECTION: Check appropriate section(s) to which your paper/poster should be assigned. If you check more than one, rank sections as to your preference (with "1" being first preferred). Paper sections will be established based on needs. Posters will be grouped by subject area.

<input type="checkbox"/> Animal Behavior	<input type="checkbox"/> Herpetology	<input type="checkbox"/> Parasitology
<input type="checkbox"/> Animal Ecology	<input type="checkbox"/> Ichthyology	<input type="checkbox"/> Plant ecology
<input type="checkbox"/> Animal physiology	<input type="checkbox"/> Invertebrate zoology & entomology	<input type="checkbox"/> Plant physiology
<input type="checkbox"/> Aquatic, wetland & marine ecology	<input type="checkbox"/> Ornithology	<input type="checkbox"/> Teaching biology
<input type="checkbox"/> Genetics, cell & molecular biology		
<input type="checkbox"/> Other (specify) _____		

9. AWARDS: If you intend to apply for one of the following awards, please indicate this below, so the Program Committee can schedule talks appropriately. See this issue of *Southeastern Biology* for specific application instructions (including contact persons and addresses). *This year, you must check off on the abstract*

submission form that you want to be considered for the poster award. Only student authors who request consideration for the poster award will be judged. First author must be the student to be considered.

_____	ASB Student Research Award (\$600)
_____	ASB Faculty Research Award (\$600)
_____	ASB Student Poster Award (\$300)
_____	Odum Award (\$500)
_____	Aquatic Biology Student Award (\$200)
_____	NC Botanical Garden Award (\$100)
_____	SEASIH Ichthyology Award (\$100)
_____	SEASIH Herpetology Award (\$100)
_____	ASIH Gibbs Memorial Award (\$7,500)

ABSTRACT REQUIREMENTS

PLEASE FOLLOW THESE FORMATTING INSTRUCTIONS EXACTLY, OR YOUR ABSTRACT WILL BE RETURNED TO YOU FOR REVISION. IF IT IS RESUBMITTED AFTER THE DEADLINE, THE ABSTRACT WILL NOT APPEAR IN SOUTHEASTERN BIOLOGY IN THE APRIL 2002 ISSUE.

ABSTRACT: Please send the abstract as an attached file to an e-mail message to the following address: **asb@appstate.edu**. Do not paste the abstract into the body of the e-mail message. The file must be in 9 point Arial (if your computer does not have Arial, send it in Times Roman), with margins of 1 inch right and 2½ inches left. Do not place hard returns at ends of lines; allow word-wrapping. The abstract must not exceed 250 words. Directions for formatting the abstract are given below and at the meeting web site: <http://www.asb.appstate.edu/asb2002.htm>. If you have any additional questions, you may contact the Program Co-Chair, **Dr. Kenneth Shull**, e-mail: shulljk@appstate.edu; phone: (282) 262-2675; fax: (282)262-2127. Other members of the Program Committee may be contacted. These are **Dr. Mary Connell**, (828) 262-2671 connellmu@appstate.edu, and **Dr. Skip Sedivec**, (828) 262-2679. sedivecmj@appstate.edu,

1. Indent author, institution, and title information 1 tab stop (½ inch). Type in the following order: AUTHOR'S NAME(S) all capitalized; last name first for first author; other authors' names (if any), first names first. If two authors, separate names with "AND". In the case of more than two authors, separate all but last name with a comma and separate the last two with ", AND". End with a period.
2. Institution(s) follow authors' names directly. Maintain the same indentation as names and end with a dash (--). In the case of two or more authors from different institutions, place all author names together first, followed by all institutions in the same order. If necessary, key the authors' names to the institutions by a superscript number. See example below or on the website.

3. Start the title immediately after the dash without a space. Capitalize first letter of first word, then only proper and scientific names as customary. Underline all of the title, and maintain the same indentation as name and institution. End with a period. Leave one full blank line between title and abstract text.
4. Start text of abstract on a new line. Do not indent first line. Use one paragraph for entire text. Do not put any reference citations in the abstract. Justify both left and right margins for best appearance.
5. Single space all typing. Put all taxonomic names in *italics*.
6. If a grant source is acknowledged, place at end of text without a new paragraph.

EXAMPLES

RADENBAUGH, TODD A. United States Peace Corps, Jamaica--Major plant community types of Duncan Bay, Jamaica, West Indies.

There is an urgent need to record and describe the coastal ecosystems on the North coast of Jamaica before they are severely altered by human influences. A new escalation in housing and resort developments, especially in the western parishes of St. James and Trelawny, is severely threatening the . . .

DAVIS, JENNIFER¹ AND DWAYNE WISE². Shorter College and Mississippi State University--Causes and consequences of elevated levels of meiotic abnormalities in laboratory colonies of the crane fly *Nephrotoma suturalis*.

Progeny of five wild-caught crane flies were compared to a laboratory colony of *Nephrotoma suturalis* for mean % chromosomal abnormalities, mean % survival, and parameters indicative of developmental rate.

7. NOTE: Prior to the meeting the program will be posted on the meeting website <http://www.asb.appstate.edu/asb2002.htm>. You can check there to see the day and time of your presentation.
8. Reprints of abstracts are not available. You may duplicate the printed abstracts from *Southeastern Biology*.
9. Important: In case of error in your name or title or questions about your presentation, please notify the Program Co-Chair, Dr. Ken Shull as soon as possible.

PRELIMINARY AUDIO-VISUAL INSTRUCTIONS FOR THE 2002 ASB ANNUAL MEETING

Listed below are the preliminary instructions for prospective presenters at the 2002 Annual Meeting at Appalachian State University. We are planning to equip each presentation room of the conference with an overhead projector, slide projector, data projector and laptop computer (see below). All presenters are asked to be at the presentation room 30 minutes *prior to the start of the session* to load their presentation. An audiovisual assistant will be available in each room to assist with loading the material.

An update on the audiovisual aspects of the conference, including the instructions for poster presentations and availability of electronic resources, will be made in the January 2002 edition of *Southeastern Biology* and will be available online at <http://www.asb.appstate.edu/asb2002.htm>. Specific questions on audiovisual topics may be directed to Dr. Michael Windelspecht, Appalachian State University (windlspchtm@appstate.edu).

Format of electronic presentations:

At this time each presentation room of the conference will be equipped with a data projector connected to a laptop computer. To ensure that the program stays on schedule, presenters will be asked not to use their own systems (laptops, etc.) unless they have specific needs. These should be cleared with the Audiovisual Local Arrangements Committee prior to the meeting. Since we will be using common equipment, the following guidelines apply for electronic presentations:

1. All presentations must be in Microsoft PowerPoint format. If you use Windows 2000 you should save the presentation in a Windows 97/95 format to ensure compatibility with the projection systems.
2. The presenter must arrive 30 minutes before the start of the session to load their presentation to the laptop. All presentations will be loaded directly onto the hard-drive of the laptop.
3. The presentation must be brought to the meeting in PC format, and loaded onto a CD-ROM, Zip disk or floppy disk. At this time Mac platforms will not be supported.
4. Internet access may not be available in each conference room. Thus, presenters should make provisions to load web sites directly into their presentations, or screen capture images prior to arriving at the conference.

All presenters should be prepared for possible technological problems. Each presenter who intends to use an electronic format should have a backup system consisting of slides or overheads. If for some reason an electronic presentation cannot be started within the first *two minutes* of the allocated time slot, the moderator of the section will ask the presenter to switch to his/her alternate format (slides or overheads).

ASB 2002 FIELD TRIPS - PRELIMINARY INFORMATION

As we did in 1991, we will be planning a number of very interesting and enjoyable field trips in the surrounding area, as well as a mid-week field trip for spouses and others, to the Biltmore House in Asheville, which is the largest house in America. All trips will be led by local experts, and transportation will be provided. Some will be half-day trips, others all day. All trips, except the Biltmore House and shopping trips, are planned for Saturday, April 13th. Please note that this is only a preliminary list of trips, and others will be planned. See the January issue for detailed information on these trips.

Field Trips

- 1. Biltmore House** - a mid-week (Thursday) trip to the largest house in America, and formerly the summer home of George Vanderbilt. Currently, the house sits on nearly 8,000 acres of land and contains display gardens, restaurants, a winery, and a newly completed lodge. One of the most visited tourist spots in all of North Carolina!
- 2. Shopping and sight seeing** - for those accompanying attendees and those who want a break. Trips to the Mast Store, Linville Viaduct, crafts shops and other points of interest in the Boone area.
- 3. Grandfather Mountain** - a half-day trip to this botanically rich isolated peak in the Blue Ridge. This is one of three Man and the Biosphere reserves in North Carolina, and the only privately owned one.
- 4. Mount Mitchell State Park** - Mt. Mitchell is the highest peak in the eastern United States (6684' elev), and is the centerpiece of the state's first park. It adjoins the Blue Ridge Parkway, and has stunning scenery, as well as remnants of spruce-fir forest and high elevation northern hardwood forest.
- 5. Stream trip** - survey of the major fauna of high elevation streams of the southern Appalachians, and discussion of the immediate ecological threats to these fragile systems.
- 6. Linville Gorge Wilderness Area** - birding and plant identification in this nearby wilderness area. We will hike down to the river and back, and view the impacts of last season's fires, which burned nearly 80% of the gorge.

PLENARY SPEAKER FOR THE 2002 MEETING

John R. "Jack" Horner, Curator of Paleontology at Montana State University's Museum of the Rockies in Bozeman, Montana, will be the plenary speaker on the night of April 10, 2002. Dr. Horner is a noted paleontologist who has made many discoveries that have changed our view of dinosaur life and is renowned for giving excellent presentations on the subject. He and his associates have recently found several *Tyrannosaurus rex* fossils. You can follow their 2001 field season on the web at <http://museum.montana.edu/>.

GUIDELINES FOR STUDENT POSTER SESSION AND ASB POSTER AWARD (\$300)

Poster sessions have been incorporated as a regular means of scientific presentation at the annual ASB meetings. In 2002, poster sessions will be limited to student participants. This type of presentation provides a more informal environment that encourages a direct interchange of ideas and discussion between student and audience. In order to stimulate greater use of posters as an effective means of presenting research results, ASB awards a \$300 cash prize to the best poster presentation with a student as the senior author. This year, you must check off on the abstract submission form that you want to be considered for the award. Only student authors who request consideration for the poster award will be judged. Adherence to the following guidelines will help ensure the effectiveness of the poster presentation and consideration for the award.

- (a) Posters must fit in an area 8 feet wide and 4 feet high. Presenters must provide their own pins to attach posters to poster boards.
- (b) Posters must be displayed from 10:00 a.m. Thursday through 5:00 p.m. Friday. Authors will be required to be present at specified times during the annual meeting.
- (c) Posters should be carefully planned to maximize clarity and simplicity in conveying information.
- (d) Posters should have a heading including a title, author, and author's institution(s). This heading should be placed at the top in letters no less than 3 cm high.
- (e) The body of the poster, including text, figure legends and table captions, should be in type no smaller than 18 pt (3-4 mm) and *must* be legible from a distance of about 1-2 meters.
- (f) The body should be self-explanatory and should include figures, tables, graphs, maps, or photographs displayed in a well organized, coherent, and easy-to-follow sequence from top to bottom. Each illustration should contain a caption. *Do not over crowd the display.*
- (g) A limited degree of text may be included, but care should be taken not to overwhelm the audience.
- (h) A large, abbreviated version of the abstract should be presented at the top of the poster, but below the heading. A clear listing of specific conclusions should appear at the bottom or end of the presentation.
- (i) In addition to adherence to the above-listed guidelines, poster presentations will also be judged using the following specific criteria:
 - (i) overall aesthetics and attractiveness of presentation.
 - (ii) ease of reading from a distance (1-2 meters).
 - (iii) clear and concise organization.
 - (iv) clearly stated hypothesis.
 - (v) soundness of methods for testing hypothesis.
 - (vi) how well conclusions are supported by results.

Further inquiries may be directed to the chair of the ASB Poster Award Committee: Dr. Steve Baker, Biology Department, Oxford College of Emory University, Oxford, GA 30054, (770) 784-8446, FAX (770) 784-8423, sbaker@emory.edu.

**NOMINATION FOR ASB OFFICERS AND EXECUTIVE
COMMITTEE POSITIONS**

DEADLINE: 19 OCTOBER 2001

To members of the Nominating Committee: I wish to suggest that you consider the following ASB member(s) in selecting nominees for officers and executive committee positions. (Please include the institutional address of each nominee.)

PRESIDENT-ELECT _____

VICE-PRESIDENT _____

TREASURER _____

EXECUTIVE COMMITTEE
(two will be elected for three-year terms)

MAIL TO: Dr. Patricia Parr, P. O. Box 2008, Oak Ridge National Laboratory,
Oak Ridge, TN 37830-6038, (865) 576-8123, FAX (865) 576-8646,
parr@ornl.gov.

NAME & ADDRESS OF NOMINATOR _____

“TRAVEL” SUPPORT AWARDS FOR GRADUATE STUDENT MEMBERS OF ASB

DEADLINE FOR POSTMARK: 18 JANUARY 2002

Limited funds are available to partially defray the expenses of graduate students attending the Annual Meeting. **The awards are for lodging and meals only, including the ASB Banquet.** Departments are urged to provide transportation for their graduate students. *Recipients must be members of ASB.* The guidelines for application are as follows:

- (a) *The recipient is a current member of ASB.*
- (b) The recipient must be presenting a paper or poster at the Annual Meeting and must include a separate copy of the abstract of the paper or poster to be presented along with the application.
- (c) The recipient must be currently enrolled as a graduate student in the department where he/she conducted this research.
- (d) Student travel awards are granted on a competitive basis. Applicants must document expected expenses and list other sources of financial support for this meeting, including institutional aid, shared lodging and shared transportation.
- (e) In a paragraph, give a brief history of your education to date: indicated how many years you have been in graduate school and the expected date of completion of work for your degree, your major field of study and research, publications including those in press and in preparation, degree sought, name of major professor and any other pertinent details.
- (f) Give your source(s) of support while in graduate school: e.g. NSF, NIH, USDA, Teaching Asst., Research Asst., etc.
- (g) Include a letter of recommendation for an ASB support award from your faculty research advisor. This letter should comment on the work being presented and indicate the financial need of the student presenter. It should also indicate whether any departmental or other funding is available to the student.
- (h) Send application with supporting letter to: Isaure de Buron, Department of Biology, College of Charleston, 58 Coming St., Charleston, SC 29424, Tel. (843) 953-5696. In addition, e-mail a copy of your completed application documents without the supporting letter to: deburoni@cofc.edu.
- (i) Applicants will be notified of the decision of the Committee as soon as is practical. Recipients of the award will receive their checks at the meeting.

Research Awards

ASB FACULTY RESEARCH AWARD (\$600)

Given for an especially meritorious manuscript presented orally by the author(s) at the Annual Meeting of ASB. In order to qualify for this award, the author(s) must have presented the work orally at any previous annual meeting or have submitted an abstract by the November abstract deadline for an oral presentation at the next annual meeting. The manuscript must either have been submitted for publication or be ready for submission and carry the format of the journal to which it will be (or has been) submitted. Author(s) must submit four copies of their manuscript and short biographical sketches of each author. Manuscripts received by 11 January 2002 will compete for the 2002 Faculty Research Award. Manuscripts not received by this deadline (but submitted by 11 January 2003) will remain in competition for the 2003 Faculty Research Award, subject to the following condition, which applies to ALL manuscripts eligible for this award: manuscripts may be in press, but not published prior to the last annual meeting. Only members of ASB are eligible. Judges will use a standard evaluation form that includes the following criteria: significance of ideas, soundness of hypotheses, originality (creativity), quality of methodology, validity of results, soundness of conclusions, clarity, completeness, organization, and contribution to the field. At the discretion of the Faculty Research Award Committee, the award may be withheld or it may be split in case of a tie.

Committee Chair: John Herr, Department of Biological Sciences, University of South Carolina, Columbia, SC 29208, (803) 777-8110, FAX (803) 777-4002, herr@biol.sc.edu.

ASB STUDENT RESEARCH AWARD (\$600)

Given for an especially meritorious manuscript presented orally by the author(s) at the Annual Meeting. In order to qualify for presenting the paper, the author(s) must submit an abstract by the November deadline. Papers submitted for the competition must be received in triplicate and in their entirety by the January deadline and must be journal-ready manuscripts worthy of publication. The student award (sponsored by Martin Microscope Company) is given to the senior author if she/he is a graduate or undergraduate student at the time of presentation. To qualify, author(s) must submit an abstract, title form, and application for the award by 16 November 2001, and four copies of the journal-ready manuscript with abstract, title form, and short biographical sketches of each author by 11 January 2002. Only ASB members are eligible. Judges will use a standard evaluation form that includes the following criteria: significance of ideas, soundness of hypotheses, originality (creativity), quality of methodology, validity of results, soundness of conclusions, clarity, completeness, organization, and contribution to the field. At the discretion of the Student Research Award Committee, the award may be withheld or it may be split in the case of a tie. Papers may be in press, but not published prior to the previous annual meeting.

Committee Chair: Richard N. Henson, 201 I. G. Greer Hall, P. O. Box 32021, Appalachian State University, Boone, NC 28608, (828) 262-3078 or (828) 262-2677, hensonrn@appstate.edu.

ASB STUDENT RESEARCH AWARD IN AQUATIC BIOLOGY (\$200)

Sponsored by Wildlife Supply Company/WILDCO, the purpose of the award is to encourage excellence in aquatic biology research by undergraduate and graduate students. Students who are members of ASB and whose work is sponsored by a professional biologist who is also an ASB member are eligible. The paper must be based on research designed and completed by the student and it must be presented orally by the student as senior author at the Annual Meeting. To be eligible, author(s) must submit an abstract, title form, and application for the award by 16 November 2001, four copies of the journal-ready manuscript with abstract, title form, and short biographical sketches of each author by 11 January 2002 and a letter from the sponsor affirming student status at the time the research was completed and sponsorship of the student to the chair of the Student Research Award Committee. Judges will use a standard evaluation form that includes the following criteria: significance of ideas, soundness of hypotheses, originality (creativity), quality of methodology, validity of results, soundness of conclusions, clarity, completeness, organization, and contribution to the field. At the discretion of the Student Research Award Committee, the award may be withheld or it may be split in the case of a tie. It is intended that aquatic biology be broadly interpreted. For example, research projects on aquatic organisms, wetland biota, and water quality are all eligible. **Committee Chair:** Richard N. Henson, 201 I. G. Greer Hall, P. O. Box 32021, Appalachian State University, Boone, NC 28608, (828) 262-3078 or (828) 262-2677, hensonrn@appstate.edu.

EUGENE P. ODUM AWARD (\$500)

Given by the Southeastern Chapter of the Ecological Society of America for the best ecological paper presented by a student. Undergraduate and graduate students are eligible and the student must be the sole or senior author. The paper must deal with a clearly ecological topic and should be presented in any of the following sessions: Aquatic Ecology, Plant Ecology, or Animal Ecology. One copy of the title and abstract should be sent to the Program Chair by November 16, and a second copy to Dr. Ken Marion, Biology Department, University of Alabama at Birmingham, Birmingham, AL 35294; (205) 934-3582; kmarion@uab.edu.

THE NORTH CAROLINA BOTANICAL GARDEN AWARD (\$100)

Given by NCBG (through the Southeastern Section of the Botanical Society of America and the Southern Appalachian Botanical Society). This is awarded for a paper presented at the annual ASB meetings that best advances our understanding of the biology and conservation of the southeastern plants and thus contributes to the mission of the North Carolina Botanical Garden. Of special interest to the Garden are the rare plant species of the Southeast: why they are rare; how they interact with plants, animals, and their environment; and what can be done to ensure their survival. The paper may deal with a broad area

including systematics, ecology and conservation. All individuals who are eligible to present at the ASB meetings are eligible for this award. They may be students, faculty or others.

Awards Committee Chair: Dr. John Randall, Department of Biology, University of North Carolina, Greensboro, NC 27412, (919) 962-0522, FAX (919) 962-3531, jrandall@email.unc.edu.

TRAVEL SUPPORT AWARDS FOR STUDENT MEMBERS OF THE SOUTHEASTERN DIVISION, AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS

Travel grants of \$50 each are available to a limited number of student members of SEASIH to attend the ASB annual meeting being hosted by Appalachian State University on 10-13 April 2002. Applicants must be presenting a paper or poster at the meeting. Students seeking travel awards should provide a brief justification for their request and an abstract of their paper/poster by 2 February 2002. Recipients must be present at the SEASIH business meeting to pick up their award.

SOUTHEASTERN DIVISION, AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS OUTSTANDING STUDENT PAPER AWARDS ICHTHYOLOGY (\$100); HERPETOLOGY (\$100)

Students who are sole or senior authors on papers, and who are members of SEASIH may compete for this award in one of these two subject areas. To be considered, submit a copy of the abstract that was submitted to ASB to the SEASIH president at the address below by 2 February 2002. Send applications for both awards to: Dr. Mark S. Peterson, Department of Coastal Sciences, College of Marine Sciences, The University of Southern Mississippi, 703 East Beach Drive, Ocean Springs, MS 39564, mark.peterson@usm.edu.

GIBBS AWARD FROM THE AMERICAN SOCIETY OF ICHTHYOLOGISTS AND HERPETOLOGISTS FOR EXCELLENCE IN SYSTEMATIC ICHTHYOLOGY

Nominations are invited for the American Society of Ichthyologists and Herpetologists (ASIH) Robert H. Gibbs, Jr., Memorial Award for Excellence in Systematic Ichthyology.

The prize is awarded for an outstanding body of published work in systematic ichthyology to a citizen of a Western Hemisphere nation who has not been a recipient of the award. The award is offered annually and consists of an appropriate plaque and a cash award (approximately \$7500). The award recipient is announced at the annual meeting of the American Society of Ichthyologists and Herpetologists.

Nominations may be made by any ichthyologist, including self-nominations, and should include the nominee's curriculum vitae, details of the nominee's

specific contributions and their impacts on systematic ichthyology. Nominations should be submitted by March 1, 2002, in order for the nominee to be eligible for that year's award. Nominations will be effective for three award periods (2002-2004). Four copies of each nomination should be sent to Dr. Maureen A. Donnelly, Department of Biological Sciences, Florida International University, 3000 NE 151st St., North Miami, FL 33181-3000.

HONOR THY TEACHER!

ASB MERITORIOUS TEACHING AWARD: DEADLINE JANUARY 18, 2002

Each year the ASB recognizes one of its members for especially meritorious teaching. Carolina Biological Supply Company, Burlington, NC, has generously sponsored this \$1500 award, which will be presented together with an appropriate citation at the Annual Banquet in Boone, NC in April 2002.

Nominees must be members of ASB who are actively engaged in, or recently retired from, the teaching of biology in any southeastern college or university. Successful candidates typically have been teaching for at least 10 years, but there are no restrictions on size of the institution, presence of graduate program, etc. The Award simply is for highly effective teaching. There are many deserving members of ASB. However, they cannot nominate themselves, so former students or colleagues must take an active role in assembling the materials that the Committee then will evaluate.

Take the lead, pass the word—serve as the coordinator and nominate a deserving teacher! Solicit supporting letters from the nominee's present and former students. Contact his or her colleagues for additional endorsements. Be sure to include any form of recognition by the nominee's home institution of excellence in teaching, or special assignments or mentoring roles facilitating good teaching. Of special note would be the number and quality of students for whom the nominee provided primary inspiration to continue in biology, especially for students who subsequently earned advanced degrees. In short, document the educational impact this individual has made by virtue of his or her role as a biology professor.

Nominators should send a current *curriculum vitae* and all relevant documents, together with the Nomination Form for the Meritorious Teaching Award, to: Dr. Rebecca Cook, Biology Department, Lambuth University, 705 Lambuth Blvd., Jackson, TN 38301, (731) 425-3278, FAX (731) 988-4900, cook-reb@lambuth.edu. Submit all materials in triplicate by the January 18 due date. If you have any questions, please call me or send e-mail. Previously nominated candidates who did not receive the award may be re-nominated, with updated supporting materials. The Committee would welcome the task of deciding among several candidates.

Thanks for taking this initiative.

Rebecca Cook, Chair
Meritorious Teaching Award Committee

NOMINATION-ASB MERITORIOUS TEACHING AWARD, 2002

NAME:

ADDRESS:

TEACHING INTEREST:

NOMINATOR NAME/ADDRESS:

SUPPORTING DOCUMENTATION: Letter of nomination _____

(enclosed, in triplicate _____) Supporting letters _____

Curriculum Vitae _____ Additional Information (list) _____

Pat Parr, Paul Schmalzer, and Ross Hinkle.

CELEBRATION ANNOUNCEMENT

The week of 15 October 2001 will celebrate 50 years of research by the University of Georgia on the Savannah River Site in Aiken, SC. The Savannah River Ecology Laboratory, an operating unit of the University of Georgia and a contractor to the Department of Energy, will host a number of special commemorative events during that week.

The first research on the Savannah River Site was conducted by Dr. Eugene Odum, who studied land use, succession, and animal populations of the Site. To celebrate this event, there will be a special presentation, a symposium of SREL research, and numerous events for employees, the public, and former SRELIans.

The 50th Anniversary Symposium, "The Savannah River Ecology Laboratory: Fifty Years of Ecological Diversity," will be held at the SREL Conference Center on Friday, October 19, 2001. Selected "alumni" of SREL who were strongly influenced by the research they conducted at SREL and who are now well known nationally will give presentations that highlight the scientific accomplishments of SREL over the last half century. Dr. John Avise, UGA Professor and member National Academy of Sciences, will speak on the development of ecological genetics. Dr. Ray Semlitsch, Professor, University of Missouri, Columbia will address the topic of conservation biology and the influence of SREL on the field. Dr. Peter Stangel, National Fish and Wildlife Foundation Program Manager will address the area of environmental conservation. Dr. Ward Whicker, E. O. Lawrence award winner and Department Chair, Radiological Health Sciences, Colorado State University, will speak on radioecology at the SREL and the history of this area of study. SREL had a major influence on the topic of old field succession, and Dr. John Pinder, Colorado State University, will address this subject. Dr. John Giesy, Professor of Zoology and Director, Institute of Environmental Toxicology, Michigan State University, will talk about the field of environmental chemistry at SREL. Dr. James R. Spotila, Professor Betz Chair Professor of Environmental Science at Drexel University will talk about thermal ecology in the field, laboratory, and models.

Additional information on SREL and the upcoming anniversary celebration is contained on <http://www.uga.edu/srel/50thanniv.htm>.



Howard Neufeld and Terry Richardson.

Obituaries

Edward T. "Ted" Browne, 1926-2001

Our profession lost a devoted botanical scholar and teacher with the passing of Dr. Edward T. Browne in Memphis, Tennessee, on February 20, 2001. Ted, as he liked to be known, died after a long battle with multiple sclerosis, which had confined him to a wheelchair for many years.

After his graduate training at the University of North Carolina at Chapel Hill, Ted began what was to be nearly a quarter-century tenure in the Biology Department of The University of Memphis, beginning in 1967. I made his acquaintance when, as an undergraduate at what was then called Memphis State University, in the mid-1970s I took his courses in plant morphology and plant taxonomy. I have fond memories of those first experiences with botany, particularly his lectures on the Liliaceae and Iridaceae, when Ted's passion really showed, and these courses led to my decision to pursue graduate study in botany and then later make it my career. I am sure there are many other former students of his who could tell of a similar gratitude for Ted's patient mentoring.

At the University of Memphis, Ted was Professor of Biology and Curator of the Raymond Athey Herbarium. With the late Raymond Athey, Ted co-authored a checklist of the flora of Kentucky and with his graduate students he co-authored numerous papers on Mid-South floristic studies. During his final years at the University of Memphis, he spent much of his time studying pollen fertility and curating the Catmur and Barnes Orchid Collections that had been donated to the university.

Ted was also active with the Association of Southeastern Biologists, the Wild Flower Society of Memphis, and the Memphis Area Iris Society. In addition, he served two terms as a member of the Board of Directors of the Memphis Botanic Garden Foundation, during which time he also served as chairman of its horticulture committee. He is credited with founding the Memphis Botanic Garden's Spring Plant Sale twenty-six years ago and was an active advisor over the years to the MBG's Wild Flower Woodland.

I will remember Ted Browne as a real gentleman, a botanical scholar, and a person with a passion for plants. Our knowledge of the botany and horticulture in the southeastern U.S. was much enhanced through his efforts, and a generation of students, and the lay public alike, was blessed to have this kind teacher to show them the wonders and beauty of plants. Donations in his memory may be given to the Tennessee Bicentennial Iris Gardens of the Memphis Botanic Garden or The Oregon Garden in Silverton, Oregon.

--Brian M. Boom, Vice President for Botanical Science and Pfizer Curator of Botany, The New York Botanical Garden, Bronx, NY 10458

Tribute to Professor David Lindquist (February 14, 1946—January 3, 2001)

Professor David Gregory Lindquist, the ichthyologist and long-term member of the Association of Southeastern Biologists (ASB), died on January 3, 2001, at Wilmington, North Carolina, at the young age of 54. David received his B.S. degree from UCLA, his M.A. from Moss Landing Laboratories—California State at Haywood, and his Ph.D. from The University of Arizona. He authored or co-authored nearly 100 research publications on the biology of fishes and a book on freshwater fishes. His research was mainly on recruitment of fishes in natural reefs and man-made artificial reefs. He spent three months in 1988 as a Fulbright researcher in Austria.

David joined the faculty of the Department of Biological Sciences at the University of North Carolina at Wilmington (UNCW) in 1975 and served as assistant, associate and full professor, mentoring many graduate students. David was a diving marine biologist. I observed his dedication to graduate studies when I served with him on the first graduate committee, soon after the inception of the now nationally renowned Marine Biology M.S. program at UNCW. David played a key role as coordinator of the graduate program for some years and inspired many students, both undergraduate and graduate, to present research papers at the annual meetings of ASB on a regular basis.

Three years after he joined UNCW, David gave a paper on Waccamaw Lake killifish with Peggy Shute at the 1977 ASB meeting. In 1979 he brought 4 students to ASB annual meeting, each giving a paper with him. Subsequently, he came with his students, in a consistent routine, to ASB meetings of 1981, 82, 84, 86, 87, 88, 89, 91, 94, 95 and 97, totaling 26 papers contributed to ASB annual meetings. ASB was David's most favorite professional society. His health began to decline in 1998 at the peak of cancer that forced him to give up his teaching and he was made 'Professor Emeritus' and Curator of fishes at UNCW. David pursued his research faithfully, regularly coming to his office at Friday Hall and laboratory at the Center for Marine Science.

In 1999 David volunteered to help me to host the 62nd ASB annual meeting at Wilmington and served as coordinator of the exhibits. David coauthored with me a paper on "Impact of Gulf Stream on Coastal Ecosystems of Southeastern United States" in a symposium on Coastal Ecology at the 1999 ASB meeting (symposium proceedings published in the first research number of *ASB Bulletin* in 2000).

Professor David Lindquist impressed me as an active colleague, prolific in research and genuinely interested in teaching. He inspired his students and many ichthyologists in the southeastern United States. In his memory and honor I have named the reefs 23 miles off North Carolina Coast in Onslow Bay as "Lindquist Coral Oculina Massiffs," in a paper now in press in *Hydrobiologia*. Dave's twinkle in the eyes and his pleasant smiles will also be remembered by all those who knew Dave.

--Robert Y. George, Professor of Biology and Environmental Studies, UNCW, and President, George Institute for Biodiversity and Sustainability (GIBS)



The late Professor David Lindquist.

Reviews

Henry T. Close. 2000. **The *Liguus* tree snails of South Florida.** University Press of Florida, Gainesville. 161 pages, 11 maps, 44 figures, 5 tables and 8 color plates.

This volume addresses what many would consider the most beautiful terrestrial gastropod in North America, if not the world, *Liguus fasciatus* (Müller, 1774), the Florida tree snail. This large species is extremely colorful and variable. Its shell color variability has been the historical source of excitement and interest for both the collector and the biologist. This large brightly colored tree snail is restricted to south Florida, the Florida Keys and Cuba, with another other species in the genus occurring on Hispaniola. Identification of the 52 named varieties or subspecies has long been a problem for anyone not steeped in the lore and literature on *Liguus*. The chapter on identification begins with a listing of the varieties by apical tip color and breaks the varieties up by distinguishing coloration and patterning. Each of the named varieties is accompanied by a detailed description, citation where it was originally described and the type locality from which the variety was described. Close has provided eight very nicely presented color plates of the named varieties of *Liguus fasciatus* and what he considers the range of variation of each of the varieties. This is a very useful guide to understanding the named varieties.

Unfortunately, the author chooses to ignore some of the rules of nomenclature and even would prefer that names "reflect the ways language is actually used" not based on biological relationships. I am continually disturbed by the constant reference to the interbreeding of forms. This species is polymorphic and each of the named color combinations represents an expression of the genetics behind the apical and columellar color, green lines and the shell color. Species hybridize not color forms.

A title overlooked in this fine volume is the literature citation compendium of the Family Orthalicidae that includes the genus *Liguus* by Richardson (1993). Another paper of interest, published while this volume was in press, examines *Liguus* host-tree selection (Bennetts et al. 2000). I think this is a valuable and well-illustrated volume which will be very useful to anyone interested in the color variation in the Florida treesnail either as a collector or a malacologist attempting to curate a museum collection. This volume should be in the library on anyone interested in the terrestrial gastropods of North America.

Literature Cited:

- Bennetts, R.E., S.A. Sparks, and D. Jansen. 2000. Host-tree selection by Florida tree snails, *Liguus fasciatus* (Müller, 1774), in Big Cypress National Preserve, Florida, USA. *The Nautilus* 114(3):112-116.
- Richardson, C.L. 1993. Bulimulacea: Catalog of species. Amphibulimidae, Anadromidae, Grangerellidae, Odontostomidae, Orthalicidae. *Tryonia* Miscellaneous publications of the Department of Malacology, The Academy of Natural Sciences of Philadelphia. No. 27:I-v, 1-164.

ARTHUR E. BOGAN. Curator of Aquatic Invertebrates, North Carolina State Museum of Natural Sciences, Research Laboratory, 4301 Reedy Creek Road, Raleigh, NC 27607.

Waldorf, Elizabeth S. 2000. **Environmental Science Workbook.** Tapestry Press, Biloxi, MS. 200 pages plus a 60-page attachment of Lab Reports.

This workbook is intended as an introductory information source with laboratory exercises in environmental science. It should be noted that "Environmental Science" is a very diverse subject that can include biology, geology, ecology, chemistry, waste management, political science and other disciplines. It is, therefore, a very difficult topic to summarize in an effective yet interesting manner. This workbook does a very good job in providing an interesting survey of topics that relate to the overall subject of environmental science. The text discusses decomposition, plant and animal ecology, environmental problems and brings in some historical perspective. Although other textbooks have discussed these same topics, this workbook provides a more abbreviated treatment of the topics.

General Comments

It should also be noted that the subtitle of the Lab Report attachment is "A Laboratory Manual for the Southeastern States." The text, therefore, suffers an inability to be universally applicable for use in other colleges and universities because the author chooses to discuss topics and design laboratory exercises that not only apply directly to the Gulf Coast area, but her laboratory specifically. For example, there are numerous references such as: "on our campus," "trees from our state" or "Look carefully at the preserved dissected cat in the clear plastic box." With a little effort, the text could be modified to make references more applicable to other settings and classrooms.

Since this is an introductory text and the students are being introduced through laboratory exercises to scientific investigation and observation, it would be helpful to add some information and attention to appropriate scientific methods such as the use of controls, the need for the reduction in variables, and proper laboratory and record keeping techniques. Minor changes can be made to the existing exercises to achieve this goal. For example, page 39 discusses water pollution and asks the students to measure nitrate concentration of a local water source. To what do they compare their results? Where is the discussion of background nitrogen levels? Proper record keeping should also be stressed. An exercise is discussed on pages 73 and 74 where pH is to be measured in water containing moss and different treatments. However, the test tubes are not uniquely labeled which is inappropriate in most laboratory settings. In addition, some tables throughout the text and lab report attachment should be re-evaluated to ensure they have been appropriately labeled. For example, tables in chapter 16 in both the text and lab report ask for entries of weight, "y," "y²," "DS," "Tk" and "AI." However, the definitions of abbreviations are not provided as footnotes to the tables and units are not listed for any measurements. Since the first chapter introduces concepts of graphing, the topic of appropriate record keeping can be discussed here.

Some exercises are described to a point but tend to leave you hanging with regard to what should happen next. For example, page 66 describes an exercise that examines termite activity. The last phase of the exercise is described and ends with the text provided below:

"Obtain two blocks of wood. Select pine and another type. Using a permanent marker label each with the kind of wood, your initials and the date. Soak these in water for 20 minutes. Blot them dry and weigh each. (Research scientists would determine dry weight, but due to limited lab time we will use wet weights.) Bury them beneath the leaf litter beside your mesh leaf bags."

Now what? The lab report attachment merely asks the students to record the initial measurements. Are the students to wait for a particular length of time and then make more measurements and draw some sort of conclusion from the results? What amount of time should they use, what sort of hypothesis are they trying to evaluate? Another example can be found in the exercise on leaf decomposition on pages 51 and 52:

"Mark the date and your names with a permanent (water insoluble) marker on the label and close the bags. In a woodland beneath litter lay them on the A1 soil horizon upper surface and cover with litter. Place your two bags near each other. Make exact notes to help you relocate this site."

Now what? I am certain that the author provides her students with the appropriate next steps in class. However, these next steps should also be identified in the text.

The Table of Contents for the text separates the chapters into major topic areas such as plant ecology and environmental problems. It may be helpful to reorganize the text so that these major topic areas are given some discussion that introduces the subtopics and puts them into perspective. The text can also benefit from a complete editorial review for sentence structure, punctuation, and grammar. With some attention by an editor, the text would flow more evenly and be less cumbersome in sections. There are also some instances of "widows and orphans" where subheading titles are found at the end of pages rather than at the beginning of the page with the associated text.

Some Specific Comments

Page 44, Soil Components, last two paragraphs. The text asks the students to pass broken up soil through a series of sieves and then defines what is found with each range of particle sizes. It would be helpful to add the sieve sizes that are suggested for this exercise.

Page 52, Soil Animal Survey, first sentence. The text asks to: "Transfer your vials of animals extracted from soil in the previous exercise to a petri dish." What previous exercise?

Page 70, Acquiring Minerals and Metals, first two paragraphs on page. The text discusses the absorption of metals by Sphagnum. The text defines arsenic and mercury as pollutants, but does not inform the reader that these metals are also found as naturally occurring metals. Therefore, their presence in plants, soil or air does not imply that these media are polluted unless some comparison to background concentrations is made.

The text on this page also describes an exercise where Sphagnum can be placed in nylon mesh bags, washed with acid to remove previously collected metals and then placed at a test site to collect site-related metals. It is unclear whether this is intended as merely information or if this is to be a student

exercise. If a student exercise is the intent, what kind of acid wash is suggested? What digestion technique should be used to extract collected metals? What analytical technique is used to measure extracted metals?

Page 79, Pine Resin, second sentence. The sentence states: "Resin is a mixture of 25% turpentine and waxy, amber to black rosin." Is resin 25% turpentine and rosin and 75% other components, or 25% turpentine and 75% rosin? Please define rosin.

Pages 85 and 86, Dragonflies. The chapter this section of text is found in is called "Cattails." This subsection provides a very interesting discussion about dragonflies; however, the chapter is supposed to be about cattails. Perhaps this section is more appropriately placed in the animal ecology section, or the chapter title can be changed to "wetlands and marshes."

Page 107, Physiology, second paragraph. The text states that an oyster body contains "8-11% protein; 3.7-9.6% carbohydrate; .4-9.5% glycogen [animal starch]; 1.2%-2.5% fat; .9-3% minerals (Na, K, Ca, Mg, Cl, Br, P, S) and 76%-89% water." Since glycogen is a carbohydrate, it would seem inappropriate to categorize glycogen separately from carbohydrates.

DEBORAH MCKEAN, PH.D. Assistant Professor, Department of Biology, University of Cincinnati, Raymond Walters College, Cincinnati, Ohio 45242.



Eugene Odum addresses the SE Chapter of the
ESA Silver Anniversary audience.

NEWS OF BIOLOGY IN THE SOUTHEAST

Jon R. Fortman--News Editor
Division of Science and Math
Mississippi University for Women
Columbus, MS 39701

ABOUT PEOPLE AND PLACES

KENTUCKY

Department of Biology, Western Kentucky University. Drs. Gary E. Dillard and Robert D. Hoyt have retired after 33 and 32 years, respectively, of service to the Department. Dr. Richard Bowker of Alma College, Michigan, has been appointed Department Head effective 1 July 2001. New faculties are Heather DeHard (Ph.D., University of Alabama, General Biology and Microbiology) and Phillip Lienesch (Ph.D., University of Oklahoma, Fisheries Biology).

MISSISSIPPI

Mississippi University for Women, Division of Science and Math. Dr. Nancy Bryson (Chemistry) is the new Division Head. Dr. Barry Posin, who served as interim Head for two years has gone back to classroom teaching. Ms. Nora Howell has retired from the faculty after 39 years. She will continue to teach a few courses from time to time. Dr. David Carson (Biochemistry and Genetics) and Dr. Lani Lyman-Henley (Vertebrates, Invertebrates, and Ecology) have left the faculty for other positions.

Mississippi State University, Department of Biological Sciences. Graduate students, Jeremy Alley, Robin Kuntz, Karen Taquino, and Mary Wade, and an undergraduate, Magan Green, were inducted as associate members into Sigma Xi, the National Honorary Research Society. Dr. Todd French was promoted to full membership into Sigma Xi. Magan Green received the 2001 Research Award for the College of Arts and Sciences in the Undergraduate Student Category and Karen Taquino received the 2001 Research Award for the College of Arts and Sciences in the Graduate Student Category at the Ralph E. Powe Awards Banquet. Karen Taquino won First Place in the student competition for her scientific presentation and Dr. Todd French, Third Place, for his presentation at the 10th Southern States Annual Environmental Conference held in Biloxi, MS. Karen Taquino also presented a scientific paper at the Mississippi Water Environmental Association meeting in Jackson, MS. Todd French received his Ph.D. degree in December 2000 and accepted a postdoctoral position in the Department. Robin Kuntz, a recent graduate from the Department, along with Todd French, and Karen Taquino, are co-principal investigators with Dr. Lewis R. Brown on \$50,000 of research contracts dealing with the bioremediation of a hazardous waste site in Kentucky.

SOUTH CAROLINA

Furman University, Department of Biology. The last year has seen major changes in the faculty. Lew Stratton, Rex Kerstter, and Gil Fairbanks all retired, and Bill Teska left for a position at Pacific Lutheran University. New faculty included Dr. Sandra Larson (Ph.D. Cornell, mammalian physiology), Dr. Greg Lewis (Ph.D. Cornell, forest ecosystems), Dr. Min-Ken Liao (Ph.D. Illinois, microbiology and genetics), and Dr. Travis Perry (Ph.D., New Mexico, conservation biology/evolutionary ecology). Dr. Travis Ryan also spent a year with us, and will soon be moving to a new job at Butler University. Joe Pollard is the new chair of the department, but will be on sabbatical in Oxford, England for most of 2001-02.

MUSEUMS AND BOTANICAL GARDENS

ALABAMA

Anniston Museum of Natural History. On September 8, 2001, the Museum will host "Herpfest: A Celebration of Reptiles and Amphibians." On August 11, 2001, the Museum enjoyed its 71st birthday on *Museum Day*. For 70 years, two Egyptian mummies have attracted thousands of visitors to the Museum. The mummies became an icon of the Museum, but their display was far from spectacular. This past January 2001, the Museum announced the design and construction of a new Egyptian exhibition hall and the reinstallation of its Egyptian mummies. The 1,700 sq. ft. areas will improve the display of the mummies and enhance the interpretation of the mummification process through the lens of botany, biology, archaeology, and geology. It is hoped the hall will open in April 2002.



Frank McCormick addresses the SE Chapter of the
ESA Silver Anniversary audience.

Beta Beta Beta District I Posters

AMBROSE, BROOKE J. & JOSEPH J. LUCZKOVICH. Tau Gamma, East Carolina University--Assessment of bottom cover composition on reef crests and patch reefs in Belize following a coral reef bleaching event and Hurricane Mitch.

We examined bottom cover on protected patch reefs and unprotected reef crests at Calabash Caye, Turneffe Atoll, Belize, following a coral reef bleaching event and hurricane Mitch in 1998. We estimated bottom cover of live and dead corals, algal turf, crustose algae, calcareous algae, and macro-algae on three transects established in each reef habitat. Percent bottom cover was measured using ten randomly selected 0.25 m^2 quadrats per transect. There was a significantly greater amount of dead coral on the reef crest ($47.1 \pm 18.6\%$ SD) than on the patch reef ($31.8 \pm 24.8\%$ SD; Kruskal-Wallis test, $P = 0.007$), suggesting the hurricane and bleaching event had the greatest impact on the unprotected reef. Crustose algae was more common on the reef crest ($6.9 \pm 5.6\%$ SD) than on the patch reef ($1.6 \pm 2.8\%$ SD; Kruskal-Wallis test, $P = 0.000025$). Overall, the most frequent bottom cover category was dead coral ($39.5\% \pm 23.0\%$ SD) with live coral much less common ($6.2\% \pm 12.6\%$ SD). The coral reef at Calabash Caye is still recovering from the 1998 bleaching event and hurricane; these data provide a baseline for future studies.

BAUMBAUER, JAN & STEPHANIE DUNDA. Sigma Lambda, Wesleyan College--Lipid content of fruit-bearing invasive plant species in Middle Georgia.

The mutualistic relationship between frugivorous birds and plants is essential for seed dispersal and thus survival of plant species. Higher nutritional content of a plant species' fruits may attract more dispersal agents. In this experiment, we determined the fruit lipid content of invasive plants in Georgia using the micro-soxhlet method. After drying the de-seeded fruits in an oven at 60°C for 48 hours, each sample was extracted in a coarse-fritted glass thimble with petroleum ether at 60°C for 6 hours. Dried fruit pulp was stored at -20°C if samples were not extracted immediately. Heavenly bamboo (*Nandina domestica*) and Japanese Privet (*Ligustrum japonicum*) mean fruit lipid content was calculated as per cent mass lost after extraction. *Nandina domestica* and *Ligustrum japonicum* contained fruit lipid contents of 0.297% and 0.468%, respectively. Results from this experiment will be useful to determine if a trend in elevated lipid content of invasive over native species would indicate an evolutionary advantage and might cause the rapid proliferation of invasive species dispersed by frugivorous birds. Future investigations should include a wider variety of invasive plant species in middle Georgia to determine whether significant differences in fruit nutritional content of invasive versus native plant species exist.

BLOOM, JOSIE C. & TRIP LAMB. Tau Gamma, East Carolina University--Mitochondrial haplotype analysis of tortoise skeletal remains from the Pinacate Mts., Sonora, Mexico.

Phylogeographic variation in the desert tortoise (*Gopherus agassizii*) is partitioned into three major phylogroups. The geographic boundary for two phylogroups--designated the Mojave and Sonoran lineages--is coincident with the Colorado River. Despite this well-defined historical barrier, local migration across the Colorado has occurred, confirmed through detection of Mohave (western) haplotypes within the Sonoran (eastern) phylogroup. We report preliminary findings for a tortoise population east of the Colorado (Pinacate Mts., Sonora, Mexico) whose habitat consists primarily of Mohave vegetation. The site's unusual habitat raises the issue of the tortoises' lineage status. We attempted to extract DNA from the scutes (scales) of tortoise remains collected in the Pinacates. We secured DNA from one of four animals, and mtDNA sequence data showed the individual possessed a Sonoran haplotype. These findings are consistent with the overall distribution of the Sonoran phylogroup.

COOPER, REBECCA, INI IKPE, LISA CLOUGH, MARY FARWELL, & TERRY WEST. Tau Gamma, East Carolina University--Hypoxia-induced enzymatic stress in the estuarine fish *Leiostomus xanthurus*.

The Tar-Pamlico River basin in North Carolina is regularly the site of summertime fish kills. One possible cause of fish kills is hypoxia-induced metabolic stress. To examine hypoxia-induced stress at both the organismal and cellular levels, we exposed the common estuarine fish *Leiostomus xanthurus* ("spot") to various oxygen tensions (10%, 25%, 50%, 100% saturation). Samples of gill, liver, and muscle tissue were extracted and subsequently analyzed for both metabolic (citrate synthase and lactate dehydrogenase) and antioxidant (catalase and superoxide dismutase) enzyme activity as well as protein content. We have not found any significant changes in citrate synthase or lactate dehydrogenase activity during the twelve-hour exposure to variable oxygen tensions. In contrast, both gill and muscle tissues demonstrated a marked increase in the activity of the antioxidant enzyme superoxide dismutase under decreased oxygen tensions. We are currently analyzing our samples for catalase activity. Antioxidant enzymes like superoxide dismutase and catalase may prove to be valuable endogenous biomarkers for hypoxia-induced stress.

COX, RACHEL E. & AMY MEGGS. Sigma Gamma, Erskine College--Steps toward immuno affinity purification of jensenin G, a bacteriocin produced by *P. Jensenii* P126.

Foodborne illness poses a significant threat to the health and economics of the United States. Bacteriocins offer a defense against foodborne pathogens. Currently, nisin is the only approved bacteriocin for use in foods in the United States. The development of additional bacteriocins as food preservatives is needed in the event organisms develop resistance to nisin or for use in food in which nisin is ineffective. The antitbotulinum activity of jensenin G, a bacteriocin

produced by *Propionibacterium jensenii*, as well as its heat and pH stability suggest its usefulness as a biological food preservative. Purification of the bacteriocin is necessary if it is to be utilized as a biopreservative. Since other purification methods have not been successful, we hypothesized that an immunoaffinity technique may be a suitable option. Preliminary data suggested that antibodies generated against another *Propionibacterium* bacteriocidin, propionicin PLG-1, cross-reacted with jensenin G. To confirm that the antibodies recognize jensenin G, we performed inhibition studies, immunoprecipitation, and immunoblot analyses.

FARRIS, JASON & ROBERT TOMPKINS. Tau Upsilon, Belmont Abbey College--An ecological study of *Magnolia macrophylla* Michaux (Big Leaf Magnolia) in Gaston County, NC.

Big Leaf Magnolia (*Magnolia macrophylla* Michaux) has the largest leaf of any North American tree species. Its range includes the southeastern United States. In North Carolina it is predominantly found in Gaston County located in the western Piedmont region of the state. Andre Michaux first described this species from a population site in Gaston County. This is a preliminary study of a larger research project to better understand the ecology of *Magnolia macrophylla*. This preliminary study includes data from three population sites sampled during the 2000 growing season. Initial data suggest correlations with the presence of *Magnolia macrophylla* and mesic sites. However, less mesic sites also appear to be capable of supporting *Magnolia macrophylla* populations. This is probably a result of recent disturbance dynamics which have created gaps in the canopy allowing for less suited or less competitive species to flourish.

FURMICK, CHRISTINE J. Tau Xi, Meredith College--Characteristics of ±27 cells from Brca2 knockout mice and RACE analysis.

BRCA2 mutations have been found to play a key role in the development of inherited breast cancer. Research has focused on creating a knockout mouse that will have disrupted function of Brca mutations, and contract breast cancer in a similar manner to women with BRCA2 mutations. Homozygous <27 knockout mice have inhibited ductal branching in their mammary glands as compared to comparable age-matched wild-type mice. Radiation and growth curve experiments were performed in this experimental series, comparing wild-type and mutant cells of both murine embryonic fibroblasts (MEF) and embryonic stem (ES) cells. Exon 27 Brca 2 knockout mice may be more sensitive to radiation than wild-type mice, due to the deletion of a RAD-51 binding domain. With this deletion, the DNA repair mechanism is compromised. Mutant ±Brca2 MEF cells appear to be more sensitive to radiation and survive through fewer passages of cell growth, as compared to wild-type cells. Radiation experiments are continuing with ES cells. Rapid amplification of cDNA ends (RACE) experiments were used to compare the cDNA ends of ±27 cDNA and wild-type cDNA. These experiments are hoped to provide molecular proof that the deletion of exon 27 causes the expression of an unstable or altered transcription.

HALL, MEGHAN C. Sigma Psi, Florida Institute of Technology--A comparison of water chemistry between created and natural wetlands in Central Florida.

Wetlands are important for filtering and regulating water, and as habitat for many plants and animals. In Florida, 46% of wetlands have been drained or altered, reducing their ecosystem functions. As a step toward maintaining wetland function, mitigation is required when land development destroys a wetland. One form of mitigation is the creation of a new wetland to replace the one impacted by development. These created wetlands are constructed to replace the natural wetlands in form and function. Replacement wetlands are built to take the place of natural wetlands, while dual-purpose wetlands are used as replacement wetlands that also serve as water retention areas. The purpose of this study is to compare the water chemistry of two types of created wetlands, replacement and dual purpose, and natural wetlands. Eighteen sites of the same age, six of each type, were sampled bimonthly for physical and chemical parameters. Non-parametric and multivariate analysis statistics suggest that a statistically significant difference exists between natural and created wetland sites. These results have implications for land management and conservation efforts to create and maintain wetlands so that their functions approximate those of natural wetlands.

HART, KEVIN. Tau Eta, Catawba College--Allometric scaling of flagella in volvocalean algae.

Volvocalean green algae are an evolutionary line that ranges from single to large multicellular organisms. The algae show allometric scaling among their volume, surface area, settling rates and other qualities (Niklas 1994). After studying and measuring the flagella lengths and organism diameter of *Chlamydymonas reinhardtii*, *Pandorina morum*, *Gonium pectorale*, *Platydorina caudata*, *Pleodorina californica*, and *Volvox carteria f. nagariensis*, the results have shown scaling within the algae. When plotting the log-log relationship between the flagella length vs the organism diameter, the resulting slope is equal to 0.21. The flagella were found to be of two lengths, $\phi 10 \mu\text{m}$ and $\phi 20 \mu\text{m}$ and this correlates with the diameter of the organism.

LIVIERATOS, SPEROS G. & WHITNI DAVIDSON. Tau Chi, Armstrong Atlantic State University--Comparative survival studies and plasmid stability between genetically engineered and wildtype strains of *E. coli* in a polluted river system.

In this study, the fate and survival of a genetically engineered strain of *E. coli* (pGEM/lux insert) was compared to its wild type counterpart in a polluted river system. Genetic stability of the plasmid vector/lux insert was determined by comparing growth on selective versus non-selective media, and observing changes in colony coloration. Water samples were collected downstream from the Hercules Chemical Plant along the Frederica River in Brunswick, Georgia. Samples were placed on ice and returned to the lab. The water samples were

then subjected to three treatments (untreated, filtered (0.22μ), and autoclaved) to determine the effects of biotic versus abiotic factors. Survival studies were determined by observing the changes in bacterial concentrations at days 1, 7, 14, 21, 30, and 42. Results of this study indicate that (1) there was significant difference in survival rates between the clone and the wild type strain in all treatments, (2) survival rates for both strains were greater in the autoclaved treatment than the filtered treatment, (3) survival rates remained fairly constant with no major decrease in survival until day 30, (4) there was a significant loss of the plasmid vector in the filtered treatment compared to no loss in the autoclaved treatment, and (5) the lux gene insert in pGEM vector was stable as indicated by the lack of colony color change.

URBAN, JEANNE M. Sigma Psi, Florida Institute of Technology--Cell synchronization and flow cytometric analysis of cyclin A expression in a human leukemic cell line.

The cell cycle is highly regulated by proteins called cyclins and their respective cyclin dependent kinases. Cyclins D and E are involved in G₁-S transition, whereas cyclins A and B1 all are critical for passage through G₂ and M. The expression of cyclins is often altered in many types of cancers and such alterations are often indicative of tumorigenesis. Cyclin D overexpression for example is characteristic of mantle cell lymphoma. The timing of cyclin expression is usually determined in cell cultures growing synchronization, such as serum starvational drug exposure, may have harmful effects on the cells such as disrupting protein expression. In these experiments human leukemic cells (MOLT-4) were synchronized using the "baby machine" culture system, a synchronization technique that produces minimally disturbed, essentially pure G₁ cell populations. Cyclin A expression was determined by flow cytometry throughout two cell cycles. Cyclin A expression was seen to accumulate in mid to late S-phase reaching maximal levels in early G₂ before degradation in mitosis. In conclusion, the duration of cyclin A expression in the cell cycle was found to be shorter than previously reported.

WILLIAMS, TARA, MICHAEL MALLIN, & MATTHEW McIVER. Sigma Sigma, The University of North Carolina at Wilmington.

Urbanization of watersheds can often negatively impact water quality due to increased nonpoint source runoff. Therefore, an experiment was conducted to analyze the correlation of nonpoint source runoff and levels of the enteric pathogen indicator microbes, fecal coliform bacteria, during rain and nonrain events. The study site for this experiment is Burnt Mill Creek, a first order stream originating in Wilmington, North Carolina, which merges with Smith Creek and drains into the Cape Fear River. The area through which Burnt Mill Creek flows is characterized with much impervious surface coverage, developed land, and a watershed population including humans, pets, and wild animals. The study includes four cycles of water sampling at eight sites along Burnt Mill Creek. Two cycles of water sampling occurred during and hours within a rain event, and two cycles are to be completed when no rain events had occurred within five days.

The water samples are analyzed for abundance of fecal coliform levels and are also related to physical and chemical water quality parameters.

CASSELL, MEGAN, ZHENGYU XUE, & MARY FLING. Tau Xi, Meredith College--High throughput screening for UGT alleles among ethnic groups.

Glycosyltransferase (UGT) enzymes catalyze the glucuronidation of xenobiotic chemicals and endogenous toxins. The genes for UGT1 contain common genetic polymorphisms that are associated with variations in levels of enzyme activity. Some of the polymorphisms result in enzymes that have different activities. The purpose of this research was to compare the frequencies of common *UGT1* alleles in African American, Asian, Caucasian, Hispanic and Southwestern American Indian groups. Following TaqMan PCR, high throughput screening was used to genotype groups of individuals. The observed frequencies of the SNPs in *UGT1* first exons varied between ethnic groups, most noticeably in the following locations with their respective frequency ranges: *UGT1A8-G518C* (0.52-0.92), *UGT1A5-T791C* (0.27-0.70), *UGT1A5-T302C* (0.07-0.38), *UGT1A4-T142G* (0.05-0.31), *UGT1A3-T30C* (0.30-0.63) and *UGT1A3-T139C* (0.46-0.87). Differences in linkage disequilibrium patterns were observed between African American and Caucasian populations.

DAVIDSON, WHITNI B. AND SPEROS G. LIVIERATOS. Tau Chi, Armstrong Atlantic State University--Biological water quality analysis of Lake Arrow, a man-made, recreational lake.

Biological water quality analyses are used to determine whether water is safe for consumption, recreation, and/or seafood harvesting. Coliforms are used as indicators of water pollution since they are found in large numbers in human and warm-blooded animal waste. Fecal streptococci are also present in fecal waste and are able to survive longer in nature than fecal coliforms. Therefore, when testing recreational water, they are considered better indicator organisms of fecal contamination. Lake Arrow is a six-acre lake used primarily for recreational fishing. Preliminary studies had indicated a high coliform count at one site where a suspected septic tank leak may have occurred. This study was designed to more closely examine the biological water quality of the lake. Four samples were taken at various sites along the lake, including the suspected polluted site. Total plate counts, total coliforms, fecal coliforms, and fecal streptococci analyses were performed on all four samples. Results indicate similar total plate counts at all four sites, but a significantly higher number of total coliforms, fecal coliforms, and fecal streptococci at the suspected polluted site. Counts from this site exceeded water quality standards for recreational water. The other three sites had significantly lower numbers and were acceptable under current water quality standards.

CRAIG, STEPHANIE A. & RYAN SMITH. Tau Chi, Armstrong Atlantic State University--Degradation of chromosomal and plasmid DNA and the potential for transformation of competent cells.

The fate of extracellular DNA and its effect on the transformation of competent cells was studied in water samples collected from three sites along the Savannah River. DNA degradation studies were performed by inoculating triplicate 5 ml. water samples with both chromosomal and plasmid DNA and following their degradation at 5 minutes, 1, 6, 12, 24, 48, 72, and 96 hours. DNA was recovered as follows: phenol-chloroform extraction, centrifugation at 14K, precipitation of DNA with sodium-acetate and 95% ethanol, and resuspension in TE buffer. The recovered DNA was subjected to agarose gel electrophoresis for visual determination of chromosomal and plasmid DNA degradation. Simultaneous studies were performed to determine the effect of DNA degradation on transformation of competent cells. Samples from the DNA degradation studies were removed at the above listed times and added to competent cells to determine transformation efficiencies. Results indicate that (1) both chromosomal and plasmid DNA degradation occurred at all three sites, (2) greatest degradation occurred downstream of the industrial site and the least amount of degradation occurred upstream of the site, (3) competent cells did transform at all time intervals for all three sites, (4) greatest numbers of transformants was achieved at 48 hours then rapidly declined by 72 and 96 hours.

MONTANARO, CHRISTOPHER. Tau Eta, Catawba College--The influence of limb immobilization on the characteristic mass increase of a bifunctional muscle in the American Cockroach, *Periplaneta americana*.

Muscle 177c of male *Periplaneta americana* dramatically transforms during the terminal molt. This transformation includes a doubling of the mass, a four-fold increase in mitochondrial volume density, and a change in color from white to pink. The behavioral role of the muscle also changes from one of depression of the coxa in walking to an additional role of wing depression in flight. Previous studies examined the influence of severed neuronal input on the transformation of muscle 177c; axotomized muscles were 50% less massive than contralateral controls (Bahl, unpub.). This study addresses disuse atrophy of muscle 177c in newly molted adult males associated with limb immobilization only. Interestingly, muscles from immobilized limbs are significantly greater in mass than those of contralateral unimmobilized limbs. These results raise questions about limb immobilization, disuse atrophy, and disuse hypertrophy.

McGUIRE, AVERY. Tau Eta, Catawba College--Mathematical models in epidemiology.

Rabies is a preventable viral disease of mammals that infects the central nervous system, causing encephalopathy and ultimately death. The disease is most often transmitted through the bite of a rabid animal. Even though human deaths attributed to rabies are rare, the public health costs associated with disease detection, prevention, and control are currently rising and are estimated to have exceeded \$300 million annually. This research attempts to simulate simple epidemic temporal models for the spread of rabies in North Carolina's raccoon populations. The rabies virus in raccoons conforms to the Susceptible-Infective-Removed (SIR) model. The SIR model mechanism is defined according to the equation: $dI/dt = rSI - aI$, where I is infective animals, S is susceptible animals, a is the rate of removal for infectives and r is the rate of infection. While not obvious on the state and regional level, the cycles of rabies occurrences between endemic and epidemic levels are on the county level. Each county exhibits a characteristic period for its outbreak.

Beta Beta Beta District II Posters

BALENTINE, RHIANNON. Mu Chi, Midway College--Photocytotoxic effects of curcumin on *Staphylococcus aureus* and *Serratia marcescens*.

Curcumin is a yellow-orange compound derived from the root of *Curcuma longa*, which is a form of tumeric powder. It has been used as a medicine, spice and coloring agent. Curcumin has been proven to be nontoxic in many different cell cultures and trials. Bactericidal, as well as antiviral effects have been attributed to the curcumin at high concentrations, especially in the presence of light. The photocytotoxic effects on the bacteria were quite potent while illuminated. In the current study, *Staplylococcus aureus*, the Gram positive bacteria were killed in the presence of light and oxygen by the curcumin, but the Gram negative strain, *Serratia marcescens*, displayed a resistance to the phototoxic effects.

BRANSON, SARAH. Beta Phi, The University of West Alabama--Effect of nutrient enrichment on the growth of the seagrasses *Thallasia* and *Halodule*.

Seagrasses, like other plants, are highly sensitive to the level of certain nutrients in their environment. These nutrients must be present in certain concentrations to enable the seagrass to maintain high fitness. Nutrients may be either beneficial or harmful to a seagrass dependent on the amount the sediment contains. To determine the effect of nutrients on seagrass, a sediment nutrient enrichment experiment was performed on the seagrass species *Halodule wrightii* and *Thalassia testudinum* in Perdido Bay, FL. Since seagrasses utilize nitrogen and

phosphorus as their main nutrients, an experimental situation was designed in which these two nutrients were added to the sediment. Density and growth were measured to demonstrate the influence of sediment enrichment on *Halodule* and *Thallasia*. Nitrogen was predicted to be the limiting reagent due to the terrogenous soil of Perdido Bay and, therefore, was expected to have a larger effect on the seagrasses than phosphorus. Counterintuitively it was found that nutrient enrichment, specifically elevated levels of nitrogen and phosphorus, did not affect short-term growth or density of *Halodule wrightii* and *Thalassia testudinum*.

BURGE, SUSAN J. Mu Omicron, Columbus State University--The effect of vitamin A, C, and E mixture applications on the proliferation of non-small cell epidermoidal (squamous) carcinoma cells *in vitro*.

This study focused on the effects that vitamin combinations AE, ACE, CE, and AC at different concentrations had on the proliferation of non-small cell lung carcinoma (NSCLC) cells *in vitro*. Phase 1---the positive control of normal fibroblast cells were treated with these vitamin combinations at 100% concentration of the recommended daily allowance per vitamin, and incubated at 37°C. Phase 2---NSCLC cells were treated with different concentrations of the same vitamin combinations, and incubated at 37°C. Phase 3---the NSCLC cells were counted after 10 days. Random samples were selected from the replicates for each treatment, and the cells were counted with a hemocytometer. The results of the analysis of variance "t" test showed no significant difference among different vitamin treatments and no significant difference among concentration levels; however, it did show a significant difference among vitamin interactions. There appeared to be a downward trend in proliferation with the ACE combination, the CE and AC combinations showed similar trends to a lesser degree, and the AE combination showed a reversed trend. These results warrant a more detailed study of the effects of the ACE vitamin combination on cancer.

BUTZ, KARA. Mu Chi, Midway College--The use of marker chains to predict the effects of forest disturbances on the forest of the Siskiyou Mountains of Southwestern Oregon.

The purpose of this research is to answer the question: if the typical distribution of a particular forest disturbance is multiplied to a transition matrix containing data for the forest in the Siskiyou Mountains, how will the transition matrix transform the distribution, and what will the new distribution matrix indicate about the forest? Six different forest disturbances were selected and researched to determine the typical effects of each disturbance on a forest. An ecological succession of an actual forest in the Siskiyou Mountains of southwestern Oregon was used to determine what the actual effects of the disturbances would be on this type of a forest. The typical forest disturbances were put into distribution matrices, which were then separately multiplied to the transition matrix. Two transition matrices were used, which resulted in two different sets of data useful for comparisons. The transition matrices contained the numbers of stems per hectare for four different slope faces on the mountain. These numbers were

converted into percentages, and each transition matrix contained significantly different percentages. The typical distribution matrix was multiplied to the transition matrix containing data for a particular forest, which transformed the distribution to yield a new distribution of stems for that type of forest. The new distribution matrix acts as a model for the particular forest disturbance and its effects on a particular type of forest.

DUNDAS, BRIAN. Mu Iota, Western Kentucky University--Cloning and expression of a putative magnesium transporter in *Dictyostelium discoideum*.

The importance of magnesium in various cellular processes is evidenced by the many enzymes, transporters, and receptors that require it as a cofactor or are regulated by it. To investigate the role of magnesium in the regulation of eukaryotic cell growth and differentiation, a cDNA (SLA718) encoding a putative magnesium transporter from *Dictyostelium discoideum* was obtained and characterized. SLA718 was identified by screening the expressed sequence tag databases with sequences encoding transmembrane segments conserved between known bacterial and yeast magnesium transporters. The 2.0 kb cDNA contains an 1866 bp open reading frame. Northern blot analysis was performed using the cDNA as a probe and a 2.2 kb transcript that is more highly expressed in vegetative cells than in slugs was identified. The size difference between the mRNA and the cDNA clone suggests that it lacks N-terminal coding sequences. To obtain this sequence, 5'-RACE was performed. Sequence analysis of the RACE product showed that the EST clone does contain the entire coding sequence. The deduced protein is 622 amino acids in length and is predicted to have two transmembrane spanning domains. In future studies, SLA718 will be overexpressed to determine if it, in fact, encodes a magnesium transporter.

GABLER, Kelly. Eta Lambda, Loyola University of New Orleans--Detection of mouse mammary tumor virus-like sequences in human chromosomes using fluorescence *in situ* hybridization.

Previous research has detected in humans the existence of a sequence highly similar to the mouse mammary tumor virus envelope gene. Originally isolated only in breast tumor tissue, the human homologue of MMTV has recently been found in blood lymphocytes of some cancer-free individuals. This project developed a method for using fluorescence *in situ* hybridization to detect the presence of the human homologue (*human mammary tumor virus*) in "normal" blood lymphocytes. A 1.8 KB fragment of MMTV envelope region DNA, including the sequence homologous to humans, was isolated and biotin labeled. This probe was hybridized overnight with metaphase cells, detected with fluorescein-labeled Avidin. Slides were analyzed using a fluorescence microscope at 1000x magnification. This project has successfully developed a screen for the single copy HMTV env sequence. Initial findings suggest that the sequence can be found in humans testing positive for HMTV using the PCR-based method, but further investigation is needed to confirm these results. Current research focuses on optimizing conditions to increase signal to background ratio with this unusually

small probe. Hopefully further study of patterns of viral insertion into normal human chromosomes will eventually suggest a route of transmission.

GEIMAN, ANNA M. Mu Iota, Northern Kentucky University--Evaluation of methods to test common skin antiseptics.

Antiseptic hand sanitizers were tested for effectiveness using the Kirby-Bauer disk method. Previous studies have shown this method to be effective in the evaluation of microbial growth inhibition. However, the volatile nature of products containing alcohol as their active ingredient requires different methodologies. The most common active ingredients in the hand sanitizers evaluated are ethyl and/or isopropyl alcohol. Due to volatile characteristics of alcohol, the agents were shown to be ineffective in the inhibition of growth of both *Escherichia coli* and *Candida albicans* using the Kirby-Bauer disk method. We report here on the evaluation of methods involving Minimum Inhibitory Concentration (MIC) and time-kill studies. These methods indicate that the hand sanitizers tested are effective in inhibiting both *Escherichia coli* and *Candida albicans*.

GOLDENSTAR, III, GRANT. Beta Phi, University of West Alabama--Environmental effects on a protease exoenzyme produced by a halophilic bacterium isolated from an inland salt spring.

Organisms that inhabit a unique inland salt spring ecosystem near Jackson, AL live in salinities ranging from 0 to approximately 100 ppt (about 3-fold higher than ocean salinity) in the surface waters. Halophilic bacteria have been isolated from this ecosystem using a complex selective growth medium containing 4.3M NaCl, 0.07M KCl, 0.04M MgSO₄ and 0.002M CaCl₂. The exoenzyme protease produced by one of the halophilic isolates, RS6, was further characterized. Protease activity was found to be lower in a complex medium containing 2% gelatin than in complex medium alone. Divalent cations are required for protease activity since EDTA abolished its activity when using gelatin as a substrate. The enzyme is stable at 50°C for at least 2 hours, at -20°C for over one year, and to repeated freezing and thawing. It has optimal enzyme activity at about 37°C and is still quite active at 45°C. Inorganic salts are required for bacterial growth but does not appear to be required for enzyme activity. However, 4.3M NaCl and 3.4M KCl had little effect on protease activity. Thus, the exoenzyme protease produced by this halophilic bacterium is active at a wide range of temperature and salt concentrations.

GRAHAM, PATRICIA. Beta Phi, University of West Alabama--Sodium chloride requirements and exoenzyme profiles of bacteria isolated from saline environments.

Microorganisms are capable of surviving and growing in a wide range of salinities. In addition, many organisms produce different exoenzymes for degrading large extracellular biological molecules. Halophilic and halotolerant bacteria that exist in saline environments from a unique inland salt spring

ecosystem near Jackson, AL and coastal saline waters near the Gulf of Mexico were isolated from a complex selective liquid growth medium containing 4.3 M NaCl, 0.07M KCl, 0.04 MgSO₄ and 0.002M CaCl₂. Approximately 21% of the 28 isolates grew on a complex solid medium without added inorganic compounds, 68% required the above inorganic compounds without NaCl (but NaCl stimulated growth), and the remainder (11%) had an absolute requirement for NaCl to grow. All isolates grew at 3 and 10% NaCl and all but one grew at 17% NaCl. Only 31% of the isolates grew at 25% NaCl. The same 5 isolates (18%) produced amylase, DNAase, and protease exoenzymes. Four of these 5 isolates also produced lipase exoenzyme. The remaining isolates were negative for amylase, protease, and lipase but most appeared to produce DNAase at reduced levels. Thus, bacteria in diverse saline environments have a wide range of salt requirements with variable production of exoenzymes.

GUTIERREZ, ASTRID & SARAH KOTT. Eta Lambda, Loyola University of New Orleans--Population genetic analysis of *Triatoma dimidiata* among three houses in a village and the entire village in Guatemala.

Chagas' disease, caused by the hemoflagellate protozoan *Trypanosoma cruzi*, is a leading cause of heart disease in Latin America. The *T. cruzi* parasite is transmitted to humans via the feces of Triatomine vectors. *Triatoma dimidiata*, an important vector in Guatemala, is present in both domestic and sylvatic habitats. To facilitate control efforts targeting *T. dimidiata*, a comprehensive genetic analysis of the vector populations was performed. The genetic structure of *T. dimidiata* among three houses in a village was compared to the entire village using Randomly Amplified Polymorphic DNA-Polymerase Chain Reaction (RAPD-PCR). The genome of each bug was surveyed by RAPD-PCR using three primers. The results showed a small genetic distance among the three houses and among the entire village ($D=0.0083-0.0222$). The F_{ST} among the three houses within a village was $0.025!0.038$ and among the entire village was $0.027!0.030$, giving high average migration rates of $Nm=9.1-9.7$. The estimated heterozygosity among the three houses (0.299-0.325) and among the entire village (0.301) was high. The low F_{ST} high heterozygosity, and low genetic distances suggest that the subpopulations among the houses and among the entire village are not reproductively isolated but in fact are one large interbreeding panmictic population.

HANSEN, ELIZABETH L. Pi Delta, East Tennessee State University--Reciprocal trans-activation of lentiviral gene expression by divergent Rev proteins-implications for Rev function and viral pathogenesis.

Caprine arthritis encephalitis virus (CAEV) and ovine progressive pneumonia virus (OPPV or visna) are related lentiviruses. CAEV causes mild neuropathology, as does visna strain 1514 (vv1514). Visna strain 1772 (vv1772) and vv 1514 share >95% genomic homology and differ in only four amino acid residues, yet vv1772 is severely neurovirulent. The CAEV and visna genomes encode structural genes *gag*, *pol*, and *env* as well as regulatory protein Rev.

Rev. *trans*-activates Gag, POL, and ENV expression by binding to the *cis*-acting Rev Response Element (RRE) thus enhancing cytoplasmic transport of viral mRNAs. Previous results suggest conservation of Rev function between divergent lentiviruses. As a result, we hypothesize that vv1514 RRE-driven gene expression can be upregulated by Rev proteins from highly related (Rev-V₁₅₁₄ and Rev-V₁₇₇₂) lentiviruses. We also predict that Rev proteins from less related lentiviruses (Rev-C) will *trans*-activate through the RRE-V₁₅₁₄ less well than either visna Rev protein. We tested this hypothesis by co-transfected plasmids expressing Rev-V₁₅₁₄, Rev-V₁₇₇₂, or Rev-C with a visna 1514 Env-expressing indicator construct. Immunoprecipitation quantitated Env and Rev. As expected, these data show that both visna Rev proteins *trans*-activate through the Rev-V₁₅₁₄ at least twenty fold more efficiently than does Rev-C. Interestingly, it also appears that Rev-V₁₇₇₂ *trans*-activates RRE-V₁₅₁₄-driven Env gene expression at least two times better than the cognate, Rev-V₁₅₁₄ thus implicating the four varied visna amino acid residues as possible determinants of *trans*-activating function and viral pathogenicity.

IBRAHIM, ESHA. Pi Delta, East Tennessee State University--The effect of density and differentiation on the growth of U937 cells in culture.

U937 cells were derived from a histiocytic lymphoma. These cells grow in suspension and are one of the few cell lines that exhibit monocyte characteristics. In fact, these cells can be induced to differentiate into macrophage-like cells. The purpose of my study was to examine the density dependent growth of these cells. The cells were seeded at 6 different densities and their growth over a 2-week period was monitored by counting the cells under a hemocytometer. Cell densities were determined for both control and cells treated with 1×10^{-6} M retinoic acid. These results should assist in better management of U937 cells in culture. Determining the optimal seeding density allows for better control of cell growth and more uniform culture conditions for experiments.

KHANNA, RITU. Pi Delta, East Tennessee State University--Phylogenetic analysis of the chloroplast psbA gene sequence to infer pteridophyte relationships.

Broad relationships of the major groups of ferns and fern allies, collectively known as pteridophytes, are among the most problematic issues in plant evolutionary biology. Despite considerable research on a wide variety of evidence, definitive phylogenetic relationships remain uncertain. Further molecular analysis would help to determine how the pteridophytes are related. The chloroplast *psbA* gene is an appropriate subject for this study because it evolves more slowly than nuclear genes and is highly conserved (>80%) among distantly related plants. Although the *psbA* gene has been sequenced for many land plants, there are no published sequences for any ferns or fern allies. In this study, total cellular DNA was isolated for some key pteridophyte taxa. After amplifying and cloning the 1062 bp *psbA* gene, new sequences were obtained for three fern allies (*Isoetes*, *Huperzia*, and *Psilotum*) and one fern (*Dryopteris*).

Phylogenetic trees were constructed by using PAUP software with parsimony and likelihood algorithms. Likelihood analyses indicate that leptosporangiate ferns, represented by *Dryopteris*, are sister to seed plants. *Huperzia* and *Psilotum* form a clade sister to the fern and seed plant lineage. *Isoetes* appears as sister to other vascular plants. Additional taxa, including *Selaginella*, *Equisetum*, *Botrychium*, and *Adiantum*, are currently being sequenced.

KOEHL, ANTHONY & MEL LEAP. Mu Iota, Northern Kentucky University--Survivorship and ovipositing in female walking cicadas, Okanagana synodica.

Okanagana synodica is an annual cicada found in arid grasslands of the western United States. We captured and marked a sample of females on the day of their emergence. Of these, 20 females were sacrificed at various ages, and the number of mature eggs within them was counted. Females emerge with a large number of eggs (mean!SEM=358!40, N=9). As egg production occurs prior to eclosion, egg count decreases throughout adulthood. From censuses and focal studies we estimated that females are active about 7 hours per day, of which, 3 hours are spent ovipositing. Through direct observation of ovipositing (N=12) females, and subsequent retrieval of deposited eggs, we determined mean ovipositing rate to be 20 ! 1 eggs per hour. Based on these data, we predicted that it would require about six days for a newly emerged female to deposit all of her eggs. This prediction corresponds well with the actual survivorship data, which indicates adult females live on average 7! 0.6 days, suggesting that lifespan, number of eggs present on emergence, and ovipositing rate are interrelated by selection pressures.

LYE, DENNIS & ERIC HILLNER. Mu Iota, Northern Kentucky University--A comparison of DNA stability between intact, viable, and intact, non-viable cells of Legionella pneumophila.

The ability to distinguish between viable and non-viable cells of *Legionella pneumophila* is crucial in determining the significance of these microorganisms when encountered in environmental samples using noncultural, rapid, molecular methods. Polymerase chain reaction (PCR) methodologies detect target sequences not only from viable cells but also from non-viable cells still containing DNA fragments. In *Legionella*, the progression of events from viable cells containing stable DNA to non-viable cells devoid of intact DNA is not well understood. Previous studies suggested that DNA in intact, non-viable cells of *Legionella pneumophila* was capable for persisting for weeks in water samples taken from cooling towers. The DNA in samples taken from a pure culture of *Legionella pneumophila* cells killed by chlorine treatment was assayed for stability under different laboratory storage conditions and also by sensitivity to nuclease activity. In pure culture laboratory conditions, the stability of PCR target DNA appeared to be related to the concentration of cells present. Low concentrations of non-viable cells lost DNA, monitored using PCR analysis, faster than high concentrations of non-viable cells.

MACKAY, DORI. Eta Phi, Maryville College--Diabetically induced cataractogenesis in bovine crystallin: a biochemical relationship between diabetes and cataracts.

Other studies have shown a direct correlation between diabetes and cataracts. In this study, crystallins were extracted from bovine lens, which has been proven to have roughly the same composition as a human lens. Samples of pure α -crystallin were incubated at 37°C in a 200 mg/dL glucose solution for 0, 10, 20, or 30 days. Human cataract tissue was obtained in order to study the similarities and differences between actual cataract tissue and the crystallin protein incubated *in vitro*. Size exclusion HPLC separation on a Zorbax column was utilized to compare the extracted crystalline, the pure α -crystallin, and human cataract tissue. Emission fluorescence spectra of the *in vitro* study showed increasing intensity from the 0-day sample to the 20-day concentration at 560nm. This suggests that AGEs formed from the glycosylation of the lens crystalline in the presence of high concentrations of glucose. These findings show a relationship between diabetes and cataracts.

MYERS, JAMILA E. Mu Omicron, Columbus State University--Suitability of environmental conditions in Blue Spring Creek, Harris County, Georgia, for *Salvelinus fontalis* (brook trout) and *Oncorhynchus mykiss* (rainbow trout).

Brook and rainbow trout have been stocked in the state of Georgia. Rainbow trout have been stocked in streams and ponds on the north slope of Pine Mountain, Georgia. To evaluate a proposal by a landowner on the south slope of Pine Mountain to stock trout in Blue Spring Creek, Harris County, Georgia, I monitored water temperature, stream channel width, depth, stream flow velocity, and I sampled benthic macroinvertebrates from November, 1999 through January, 2001. Habitat measurements from Blue Springs Creek were compared with measurements from the literature for habitat requirements of *Salvelinus fontalis* (brook trout) and *Oncorhynchus mykiss* (rainbow trout), testing null hypotheses of no difference between parameters measured in Blue Springs Creek and those published in the literature. Current velocity in Blue Springs Creek appeared suitable for *S. fontinalis* but was probably too low for *O. mykiss*. Depth was suitable for *O. mykiss* but was probably too shallow for *S. fontinalis*. Appropriate macroinvertebrate taxa were sampled, although my collections suggested low levels of productivity during these drought years. Finally, summer temperatures appear to be too high for either species; therefore, I recommend against any plan to stock trout in Blue Spring Creek.

PINKSTON, SHANNON L. & CYNTHIA N. MUGI. Mu Mu, Williams Baptist College--Factors affecting growth and deformities in tadpoles: comparing river water to dechlorinated tap water.

In recent years, many amphibian populations have declined in numbers while exhibiting higher incidences of deformities. To examine whether observed abnormal development of *Rana utricularia* tadpoles resulted from lab conditions, we raised tadpoles using two treatments. One set of tadpoles was raised in river water from their location of capture while another set was raised in dechlorinated tapwater. We separated the tadpoles into dyads in individual plastic containers, resulting in ten containers for the river water group and eleven containers for the tapwater group. We recorded tadpole length, date of appearance of limbs, and date of death. We compared growth and mortality rates between the two treatment groups. Tadpoles had mean survivals of 41.85!22.8 and 25!19.8 days in tap and river water, respectively. There was a marginally nonsignificant difference between the treatments ($P=0.056$). Our results indicate that the developmental abnormalities observed previously were unlikely to be caused solely by the use of treated tap water instead of river water. The mortality rate of 100% suggests that: 1) factors harmful to the tadpoles may be present in both types of water used; and/or 2) the tadpoles may have been damaged by conditions during earlier development.

POHL, MELANIE. Eta Phi, Maryville College--Analysis of isoflavones in commercial soy foods.

The isoflavones genistein and daidzein were extracted and isolated from the following commercial soy products: soy flour, textured vegetable protein, instant soy beverage, berry-flavored soy protein shake, tofu, and toasted soy nuts. The chemical tests that were utilized included high performance liquid chromatography (HPLC), thin layer chromatography (TLC), nuclear magnetic resonance (NMR), and ultraviolet absorption. In addition, it was tested whether heating these soy products when cooking would significantly modify the isoflavone content. The results display that isoflavones are found in the various soy foods tested, and further indicate that the isoflavone concentration increased slightly when cooked.

PULFER, JESSICA. Beta Phi, University of West Alabama--The impact of sudden fluctuations in salinity on net oxygen production and ammonium uptake in estuarine *Ulva lactuca*.

Estuaries are often areas of high primary production where relatively nutrient-rich freshwater mixes with marine water. Macroalgal production can comprise a large part of this overall production and macroalgae can influence inorganic nutrient cycles through their growth and decomposition. The inorganic nutrients that fuel this macroalgal production are often derived from freshwater inputs. Estuaries subject to intense human development within their watershed often show associated hydrologic changes. In these estuaries, rapid drainage following intense rain events can lead to sudden fluctuations in salinity and inorganic

nutrient levels. In this study, we investigate the impact of rapid fluctuations in salinity on net oxygen production and ammonium uptake by *Ulva lactuca* collected from a cove within the Mobile Bay estuary (AL). Dissolved inorganic nutrient levels (nitrate, ammonium, and phosphate) and salinity were also monitored during a rain event at the study site. Experimental changes in salinity comparable to those measured at the study site resulted in a decline in net oxygen production, while ammonium uptake rate remained unchanged. These results suggest that *U. lactuca* maintains ammonium uptake under conditions of rapidly declining salinity and, thus, may have access to ammonium delivered with freshwater runoff.

RECK, JAMIE LYN & SUZANNE COCO. Mu Mu, Williams Baptist College--Factors that affect short range movement in the Arkansas brown tarantula (*Aphonopelma hentzi*).

Tarantulas are sit and wait predators. However, their movement patterns may reflect factors such as assessment of habitat quality. We tested whether the presence of food affected movement patterns of the Arkansas brown tarantula (*Aphonopelma hentzi*). We placed tarantulas within a T-shaped maze. In half of the trials, crickets were visible and audible behind a plastic barrier (alternatively on the right or left side of the T). In the other trials, no crickets were used. Each tarantula was placed at the entrance of the maze and allowed to move freely within the maze for one hour. The tarantula was returned to its cage and fed. We compared the amount of time that tarantulas spent on the side of the maze that contained crickets when crickets were present versus when crickets were not present. The tarantulas spent significantly more time in the half of the maze where the crickets were placed when the crickets were present ($P<0.05$). These data suggest that tarantulas may choose their resting location based on the presence or absence of a good source even without the reinforcement of a food reward. Such factors may also influence initial selection of a burrow site.

SHARP, CHRISTINA & JEREMIAH BIVINS. Eta Phi, Maryville College--The effect of lipid modulators on the activity of a G-protein coupled receptor.

Yeasts have been used for centuries in industry for baking and brewing, but in recent years, this organism has become widely used in science because its genome is known and biosynthetic functions are well understood. The purpose of our research was to determine the effects of lipids and other supplements on different strains of *Saccharomyces cerevisiae*. We performed growth assays to determine the effects of different concentrations of supplements on the growth of the strains. To analyze the growth of the strains, a spectrophotometer was used, which determined the density of the cultures. The results were then graphed to compare the effects of the supplements on the growth curves. At high supplement concentrations (20mM), all of the *S. cerevisiae* strains were affected. Hydroxylamine at all concentrations killed or greatly inhibited the growth of yeasts. Choline, inositol, ethanolamine and ethionine also inhibited the growth of the yeast strains, but they did not kill the organisms as hydroxylamine did. This

research has provided a solid background for other research projects and continuation of more detailed research on G-protein coupled receptors.

SPROLES, ALYSSA. Mu Iota, University of Northern Kentucky--Fertility of litters born to female rats exposed to DHEA, an over-the-counter food supplement, prior to and during pregnancy.

Dehydroepiandrosterone (DHEA) is a steroid hormone produced by the adrenal gland. It is sold as an over-the-counter food supplement to increase muscle mass and as a weight loss agent. DHEA is not regulated by the FDA because it is marketed as a food supplement and has not been properly tested for its effectiveness or its safety. Our studies on fertility rates of female rats exposed to 2X the lowest weight adjusted recommended dosage of DHEA, produced infertility in 40% of the females and reduced litter size average to 5 vs. 13 for the controls. Additionally, neonatal mortality was 266% higher in the DHEA group than in the controls. Too few pups from DHEA mothers survived to statistically test their fertility. The experiment was then rerun using 1X the lowest weight adjusted recommended dosage. The rats in the experimental group were fed the DHEA for 1 month prior to the pregnancy and during the pregnancy. Supplementation ceased upon delivery of the pups. The pups were then separated into four groups: DHEA female + control male, DHEA male + control female, control male + control female, and DHEA female + DHEA male. No differences were found in fertility rates or in the number of offspring per litter between the four groups.

THOMAS, ANGELA K. & REBECCA A. THOMPSON. Mu Iota, Northern Kentucky University--Exploring cryopreservation as a method for germplasm preservation of endangered plant species.

Seed banks are being created at Northern Kentucky University to preserve plant biodiversity. Cryopreservation is an innovative technique being investigated to store germplasm at temperatures below the homogeneous nucleation point of water (-40°C), resulting in lab-created dormancy. Germination studies are being conducted to quantify the efficacy of this method. During seed germination trials, seeds are desiccated, exposed to liquid nitrogen (-196°C) for specified intervals, and then rehydrated. The seeds are then either placed directly into a growth chamber with specialized temperature and photo period settings or cold-stratified. Germination results are checked weekly for 12 weeks. Although data are not yet complete for stratification treatments, preliminary results are encouraging. Currently, there are 13 species banked at Northern Kentucky University. Reintroduction of extirpated species into original habitats is a possible contribution of this project.

Beta Beta Beta District II Paper Abstracts

ABRAMS, MICHAEL BRANDON. Mu Iota, Northern Kentucky University
--Stromelysin gene knockout from HT1080 fibrosarcoma cells.

This is an experiment that proposes to identify the stromelysin genes located on the q arm of the 11th chromosome of human DNA (HT1080 11Q23). This particular line of fibrosarcoma has been found to produce rare enzymes that allow them to digest connective tissues and dissolve matrix. Metastasis begins as they soon begin invading surrounding space previously occupied by normally functioning cells. After identifying the gene, a knockout will be created, which is a component that inhibits the ability to mutate and metastasize. The hypothesis that is being tested is will a specific anti-sense probe eliminate the stromelysin 2 genes in the HT1080 frbrosarcoma cells. To begin the experiment, cell cultures had to be generated that would provide an ample supply of cancer DNA. It is extremely crucial that a sterile technique be practiced and followed correctly in order to ensure that these is no contamination subjected to the cells. A comfortable cell count had to be maintained to suppress nutrient competition, since cells will die from overpopulation. The stromelysin genes first had to be identified by a specific anti-sense probe being inserted into the original base sequence, and later being displayed using a southern blot DNA electrophoresis analysis. This experiment is in its initial stages. I have cultured HT1080 cells, introduced the anti-sense probe to the cell line, and later I will examine stromelysin expression by Northern and Western blot.

ANDERSON, KIMBERLY M. Mu Chi, Midway College--The effect of GDNF overexpression on sensory neurons of the trigeminal ganglion.

Glial cell-line derived neurotrophic factor (GDNF) supports the development and survival of a distinct neuronal subpopulation of sensory neurons that bind the plant isolectin B4 (IB4) and express the Ret tyrosine kinase receptor. To examine the role of GDNF in the developing nervous system, mice that overexpress GDNF in skin under the keratin 14 gene promoter were used (GDNF-OE mice). Trigeminal ganglion, which receives mechanical, thermal, noxious and proprioceptive information from the head and neck, were analyzed in wild type and GDNF-OF mice. Cell counts indicated a 40% increase in the number of neurons in GDNF-OE trigeminal ganglia, suggesting GDNF increased survival of a subpopulation of sensory neurons. Immunochemical analysis revealed a 15% increase in the number of IB4 positive neurons and a 14% increase in the number of CGRP positive neurons in GDNF-OE mice. This suggests that GDNF enhances the survival of the IB4-binding population of GDNF responsive neurons. GDNF may also be rescuing a population of CGRP binding, NGF responsive neurons that also respond to GDNF. The results indicated that like the neurotrophins (NGF, NT3, BDNF and NT4) GDNF acts as a target-derived survival factor for sensory neurons.

ASBURY, SHANE. Eta Phi, Maryville College--The study of ENOD40-GUS and ENOD12-GUS expression in genetically engineered *Aribidopsis thaliana*.

The early nodulation factors ENOD12 and ENOD40 are instrumental during the early stages of the symbiosis between leguminous plants and the nitrogen fixing rhizobia. The genetic engineering of the genes coding for these proteins and other proteins involved in this symbiotic pathway offer many possibilities both financially and ecologically. Vacuum infiltration was used to transfer each of these two genes with an associated GUS marker to separate lines of *Aribidopsis thaliana*. The offspring of these plants were then harvested and grown in selective media, and gus assays were then performed in order to ascertain the expression pattern of the two ENODs in early seedlings and the siliques and flowers of mature plants. The expression patterns of two separate lines of ENOD12-GUS were observed in *Aribidopsis* seedlings, and the expression patterns of both ENOD12-GUS and ENOD40-GUS were observed in the siliques and flowers of mature *Aribidopsis*.

BAKER, DOUGLAS T. Mu Iota, Northern Kentucky University--The effects of sodium diethyldithiocarbamate on the uptake and acute toxicity of chromium and manganese in zebra mussels (*Dreissena polymorpha*).

This project was designed to establish a possible link between industrial effluent released into the Ohio River near Marietta, Ohio and subsequent fish and mussel kills which occurred downstream from the source of the contamination. One possible mechanism for the die off involves the effects of the exotic mussel *Dreissena polymorpha* on the cycling of the heavy metals manganese and chromium. Zebra mussels remove suspended particulate matter and dissolved solids from the water column. Metals removed may accumulate in the mussels or be ejected as feces or pseudofeces. Accumulated toxins may then be biomagnified in higher trophic levels. Artificial stream environments (mesocosms) approximating as nearly as possible the conditions found in the Ohio River were created. Zebra mussels gathered from the river were exposed to a solution of chromium and manganese, or to a solution of chromium and manganese complexed with diethyldithiocarbamate. Exposure times varied from one to twenty fours hours. Samples of mussels were then collected for trace metals analysis by inductively coupled plasma spectroscopy. The remaining mussels were placed in the mesocosms and monitored for twenty days to assess delayed mortality. The impact of diethyldithiocarbamate on metal uptake and acute toxicity was determined.

BATES, LaMIESA D. & P. MUGANDA. Eta Mu, Southern University--Baton Rouge. Development of methods for experimental modulation of p53 levels in human fibroblasts.

The cellular p53 protein is classified as a tumor suppressor gene product. It patrols the DNA of dividing cells and either repairs damaged sequences on the spot or causes the imperfect cell to commit apoptosis. The presence of tumors

causes p53 levels to rise so it can function properly. The overall objective of this experiment is to develop the best methods for the experimental down-modulation of p53 in human fibroblasts. To determine the best method for experimental down-modulation in cells antisense oligonucleotides and various transfection medias will be investigated to determine the best media for down modulating p53 levels. Transfected HEL cells with labeled oligonucleotides will test the transfection medias and immunofluorescence will be done to determine the percent of transfected cells. The best media will have the highest transfection efficiency and it will down modulate p53 in cells the most.

DELATTE, RACHEL. Eta Lambda, Loyola University, New Orleans--
Relative importance of adjacent seagrass beds to the Florida blenny.

Seagrass beds are often comprised of several plant species growing adjacent to one another. Mobile organisms occupying these seagrass beds are often distributed non-randomly, suggesting a preference for one habitat type over another. For example, published research indicates that the Florida blenny (*Chasmodes saburrae*) is more abundant in turtlegrass than in adjacent shoalgrass in the northeastern Gulf of Mexico and I hypothesize that predator avoidance explains this pattern. I performed field surveys and behavioral experiments to test for behavioral preferences and to evaluate the role that predators play in shaping habitat use by the Florida blenny. Field surveys were inconclusive, probably because this species is patchily distributed. Behavioral choice experiments indicated that blennies preferred turtle grass over shoalgrass, even in the absence of predators or food resources. Predation experiments did not demonstrate differential survival of blennies in turtle grass and shoalgrass, because the gag grouper I used were not aggressive predators. However, blennies greatly increased their use of refuges within behavioral tanks after predators were added. Therefore, it appears that blennies are sensitive to the risk of predation and patterns of habitat use observed in the field may in part reflect avoidance of abundant predators in seagrass beds.

DOCKERY, JEREMY. Mu Omicron, Columbus State University--
Correlations between allozyme variation in mosquito fish (*Gambusia
affinis*) populations and water quality at Oxbow Meadows Environmental
Center, Columbus, Georgia (Muscogee County).

Previous studies have shown that differential tolerance to contaminants is linked to various allozyme genotypes. This study tests the hypothesis that allozyme frequency will correlate differently among contaminants studied. Using starch gel electrophoresis, several gene and allele frequencies were correlated to different contaminants found in the ponds at Oxbow Meadows Environmental Center in Columbus, Georgia. Although correlation coefficients do not prove a cause and effect relationship, the results of this study revealed patterns that may be associated with reduced gene and /or allele frequencies due to differences in water quality at Oxbow Meadows, or select for tolerant allele and/or gene frequencies. Contaminant induced selection can lead to significant mortality of individuals carrying sensitive genes and/or alleles producing a genetic bottle

neck, which leads to reduction in diversity. Therefore, understanding the effects of toxins and contaminated aquatic environments on the genetic variation of natural populations is important.

DOWNEY, HEATHER. Mu Chi, Midway College--Use of antibiotic susceptibility patterns to identify nonpoint sources of fecal coliforms.

Fecal coliforms continue to be a source of contamination for surface water in Kentucky. Determining the source of fecal coliforms has been difficult, due to animal sources from agriculture and human sources from leaking septic tanks and sewer lines. Five fecal samples were collected from humans. Thirty-four fecal samples were collected from beef cattle. Nine fecal samples were collected from horses. Six water samples were collected from three difference streams. Conventional biochemical methods and Enterotube II identified coliform isolates of animal, human and streams. Antibiotic susceptibility testing was conducted on each isolate from each source. Based on the antibiotic susceptibility testing patterns, the cattle, horse and human isolates were compared to the stream isolates, and stream isolates were attempted to be classified as to their sources.

FORD, LEAH. Eta Phi, Maryville College--Analysis of lipid content from *Xenopus laevis* tadpoles during altered maturation rates.

In order to determine changes in fitness among tadpoles, storage lipids were analyzed from *Xenopus laevis* tadpoles. Five cohorts of 5, 10, 50, 100, and 300 tadpoles were raised in equal volumes of water for 28 days. Lipid percent compositions of the experimental groups revealed that the least populated experimental group had a higher lipid percentage (1.1%) than the most populated experimental group (0.84%). Thin layer chromatography indicated the presence of neutral lipids in all experimental groups. Gas chromatography was used to compare the relative distribution of fatty acid methyl esters present in the experimental groups. Levels of palmitic acid, a saturated fatty acid, decreased as the experimental groups became more crowded.

GABBARD, JENNIFER. Mu Iota, Northern Kentucky University--Limited variability of genitalia size within species of the genus *Fletcheromyia* (*Diptera:Sarcophagidae*): inter-or intraspecific causes?

There are eleven different families within the group Calyptrate Diptera. The primary focus was on one family-Sarcophagidae. The morphometric variability of the genitalia and body size of two species of the genus *Fletcheromyia* (*Diptera:Sarcophagidae*) was studied. There is some variability in the body size, many closely related species, and highly complicated genitalic characteristics in the genus *Fletcheromyia*. The intraspecific variance of genitalia in *Fletcheromyia jonesi* and *F. rileyi* was studied to see if it was lower than the intraspecific variance of their body size. The variance of genitalic characteristics in *F. jonesi* and *F. rileyi* was compared to determine whether their genitalia might fulfill the function of assuring reproductive isolation. It was found that the genitalia size

varied slightly with changes in the body size of *F. jonesi* and *F. rileyi*. It was also found that there is high interspecific variation between the two species which suggests that the genitalia is species-specific and is being used by the female to determine the difference between closely related species.

GILES, DAVID K. Eta Phi, Maryville College--Synthetic and herbal antibiotics: a comparison of acquired resistance in three pathogenic bacterial strains.

The antimicrobial efficacy of three prescription synthetic antibiotics (linezolid, moxifloxacin, and quinopristin/dalfopristin) and three commercial herbal antibiotics (tea tree oil, olive leaf extract, and grapefruit seed extract) was examined. The differential effectiveness of the antibiotics was tested on three pathogenic bacterial strains: *Staphylococcus aureus*, *Streptococcus pneumoniae*, and *Enterococcus faecali*. Bacterial acquisition of resistance was determined by performing the Kirby Bauer test for antibiotic resistance and measuring the zones of inhibition over several generations. The evolution of resistance for each bacterial strain was compared with respect to the antibiotic type. Preliminary data indicated varying degrees of resistance with regard to the different antibiotics.

JOHNSON, KRISTAL & BRAD VENUTO. Eta Mu, Southern University, Baton Rouge--The germination and seedling vigor of *Spartina alterniflora* accessions from Louisiana.

Spartina alterniflora, a perennial grass, is the dominant species in Louisiana. It contributes huge amounts of organic matter in the marsh as its leaves and stems die at the end of fall. It has an extensive root system, which locks the soil down in the salt marsh, slowing erosion. Genetic improvement of plant species is well developed in crops, but these techniques have not been readily utilized to species of ecological and environmental value. This project evaluates the germination and seedling vigor of *Spartina alterniflora* as part of an ongoing breeding project. Based on the results of this evaluation GT34 is the accession that will best survive the conditions of Louisiana's Gulf Coast. Alternatives for GT34 are GF3, GT23, and GT13. These data will be used in the continuation of a coastal restoration project.

LEAP, MELVIN H. & ANTHONY KOEHL. Mu Iota, Northern Kentucky University--Sexual conflict in the walking cicada, *Okanagana synodica*.

We investigated the possibility that conflict of reproductive interests between male and female *Okanagana synodica* influenced individual female reproductive success. As is typical of polygynous species, male *O. synodica* reproductive effort is primarily mating effort. Reproductive effort in females consists mainly of ovipositing. To evaluate the potential effect of this conflict on female ovipositing success, we selected three similar clumps of shrubs and randomly assigned each to one of three categories. Category one was a control, in which males

already present remained and males were permitted to enter and leave. Category two was designated experimental two, in which males present remained and twenty-six additional males were added at the start of the experiment. Category three was designated experimental two, in which males were excluded throughout. The number of eggs laid by each individual female was recorded over a five-hour period. Results obtained from ANOVA ($F=5.821$, $P=0.006$, $DF=2, 48$) indicate that mean ovipositing success varied among shrub categories, and that the presence of males reduced ovipositing success. Results of this field manipulation were corroborated by focal studies of females; interruption of ovipositing behavior by males attempting to mate was common and appeared to reduce the time females spent laying eggs.

PITRE, SIMONE T. Eta Lambda, Loyola University, New Orleans--
Ontogeny of habitat selection by pink shrimp, *Farfantepenaeus
duoraxum*.

Pink shrimp comprise an important fishery and play critical roles as both predators and prey in estuaries of the Gulf of Mexico. A thorough understanding of patterns of habitat use is essential to successful management of this commercially and ecologically important species. Previous research documented that juvenile grass shrimp are dependent upon vegetated habitats such as seagrass beds. It remains unclear whether pink shrimp discriminate among adjacent species of seagrass, whether habitat preferences vary during ontogeny, and what mechanisms account for any patterns of habitat selection. I performed field and laboratory studies to address some of these questions. Juvenile pink shrimp were consistently more abundant and smaller in size in beds of shoalgrass than in adjacent beds of turtlegrass. Field observations indicated that the abundance and size of potential predators was greater in turtlegrass so I hypothesized that smaller shrimp preferred shoalgrass to minimize risk of predation. Initial experiments in small behavioral tanks produced results similar to field patterns, whereas experiments in larger tanks provided equivocal results. Tracking individual shrimp was problematic in the larger tanks. Overall, it appears that there is a change in habitat preference with increasing size of juvenile shrimp. Future experiments should use improved marking techniques.

REDDEN, GREGORY ADAM. Mu Iota, Northern Kentucky University--
Fertility of litters born to female rats exposed to dehydroepiandrosterone
(DHEA) prior to and during pregnancy.

Dehydroepiandrosterone (DHEA) is an androgenic steroid produced by the adrenal gland. It can cause masculinization with *in utero* exposure to doses higher than those normally produced by the body. DHEA is currently being marketed as a food supplement touted to promote weight loss. Food supplements are not regulated by the FDA, therefore, the effectiveness and side effects of DHEA are unknown. Starting in 1997, research was done by our lab to investigate the effects of DHEA on the fertility and fetal development in rats. It was shown that as little as 4X the most commonly recommended doses (but far less than what some manufacturers recommend) resulted in complete infertility.

Currently we are investigating the effects of low levels of DHEA on the fertility of pups whose mothers were exposed to 0.07 mg of DHEA/day (equivalent to the normally recommended human dosage of 25 mg/day) for one month prior to mating and during pregnancy. The DHEA pups, upon reaching 200g were mated with control rats and the numbers of offspring were compared to matings between controls. Survival rates to one month of age were also measured. Ovarian/testicular weights were compared between the control and test groups.

RICE, RACHEL. Pi Delta, East Tennessee State University--Community-acquired antibiotic resistance between *Moraxella catarrhalis* and *Streptococcus pneumoniae* using a microtiter plate method.

The conventional mode of bacterial antibiotic resistance can be traced to resistance genes that encode resistance factors. Another mode of resistance has been demonstrated, but it is not very well known. It operates in an indirect manner through co-existence of sensitive bacteria with resistant bacteria. This mode of resistance termed "community-acquired resistance" may be important in light of the continual emergence of newly resistant bacteria. This study focuses on *Moraxella catarrhalis*, a mildly opportunistic pathogen that is often isolated with sensitive strains of the more serious respiratory pathogens, *Streptococcus pneumoniae* and *Haemophilus influenza*. Approximately 95% of all current *Moraxella catarrhalis* strains have some level of penicillin resistance. Using microtiter plates we have grown *S. pneumoniae* and *M. catarrhalis* both alone and together in a series of two-fold dilutions of penicillin G from 0.25 to 16 µg/ml. Results show that when a sensitive strain of *S. pneumoniae* is grown with a resistant strain of *M. catarrhalis* the *S. pneumoniae* gains the degree of resistance of the former. We are currently investigating the relative importance of β-lactamase resistance factors in community-acquired resistance.

SEITZ, AMY ELIZABETH. Mu Iota, Northern Kentucky University--Thermal relations in the grass cicada, *Beameria venosa*.

Arid land cicadas have been the subject of several studies of thermal biology. Results suggest that many species regulate body temperature at high ambient temperatures, partly by evaporative cooling. *Beameria venosa*, one of the smallest species of cicadas, inhabits arid grasslands of the southwestern states. Adults of this annual species are active in late May, a period characterized by high temperatures and little precipitation. They conduct most of their activities on grama grasses (*Bouteloua* sp.), which appear to be dormant throughout the adult cicada emergence period. Due to their small body size and the apparent lack of water available, we predicted that *B. venosa* would exhibit a relatively high degree of thermal conformity. We measured ambient temperature, perch temperature, and thoracic temperature with the aid of a hypodermic thermalcouple probe. We recorded temperatures of 168 cicadas engaged in a variety of activities at various times of the day. Analysis of date indicates that *B. venosa* regulate body temperature as effectively as do larger species. In spite of the apparent lack of water available in their habitat, these small cicadas make

extensive use of evaporative cooling; at high ambient temperatures, thoracic temperatures was often depressed several degrees below perch temperature.

STOLTZ, CATHERINE. Mu Iota, Northern Kentucky University--The influence of temperature on ovipositing rate in the Walking Cicada, *Okanagana synodica*.

Studies of several species of cicadas conclude that adults regulate body temperature over fairly narrow limits during specific activities. This is especially true of males during singing, an activity that requires a very high metabolic rate of the timbal muscles, and is consequently constrained by temperature. We determined how thoracic temperature (T_{th}) varied with ambient temperature (T_{am}) in male and in female *Okanagana synodica*. Based on regression analysis of T_{am} vs. T_{th} , we concluded that though both males and females exhibit some regulation of T_{th} , females do so less effectively. This result suggests that maintenance of a constant T_{th} is of less importance to female activity than it is to that of males. We then predicted that the rate of ovipositing would not be influenced much by temperature. We measured the ovipositing rate and perch temperature of five individual females that had long bouts of ovipositing. Within each of these females, ovipositing rate, measured as eggs laid per minute, was not significantly related to T_{am} . A similar study was conducted with a sample of 21 females that engaged in short bouts of ovipositing at various temperatures. Among these females, ovipositing rate was not significantly related to mean T_{am} of the ovipositing bout ($r=.071$, $p=.7622$). These results support the hypothesis that temperature would have little influence on ovipositing rate.

Beta Beta Beta District I Paper Abstracts

BARTHELERY, MIGUEL. Sigma Psi, Florida Institute of Technology--Fertilization signal transduction in sea urchin eggs.

This research aims to determine the nature of the sperm-egg interaction that triggers cytoplasmic calcium release during fertilization. In echinoderms, Ca release is stimulated by the second messenger inositol triphosphate which is produced by the enzyme phospholipase C β . The upstream regulator(s) of the PL C β during fertilization are currently unknown. Sperm from a variety of organisms possess a water-soluble sperm factor (most likely a protein) that is capable of activating the calcium release pathway in eggs; however, it is unclear if this factor could stimulate PL C β activity. In the current study, detergent-free lysates were prepared from sea urchin sperm by different methods: 1) freeze/thaw in liquid nitrogen; 2) homogenization; and 3) sonication. In each sample, insoluble material was removed by centrifugation. The cleared lysates were tested for the ability to stimulate Ca release by microinjection into calcium green-loaded sea urchin eggs. At this time, only the lysate prepared by sonication has been found to elicit Ca release. The fertilization Ca increase is prevented by the microinjection of PL C β SH@ domain fusion proteins, which

prevent the activation of PL C_{ao}. Experiments are currently underway to determine if these fusion proteins will also block sperm lysate-mediated Ca release in the sea urchin egg.

BUCK, BREE J. Sigma Psi, Florida Institute of Technology--Neuroethology of infrared vision in rattlesnake and python.

Boid and crotaline snakes possess the unique ability to simultaneously image two distinct regions of the electromagnetic spectrum. These snakes combine visual information from the lateral eye with infrared information from the pit organ to form a single image of the environment. Because infrared imaging represents a novel evolutionary adaptation in an organism with severe ocular regression, we set out to determine the relative importance of these two imaging systems for predatory targeting. We found that monocular occlusion in python (*Python molurus*) and rattlesnake (*Crotalus atrox*) had no effect on strike performance. However, congenitally monocular snakes (*Python*) preferentially targeted on the sighted side. To test the role of infrared imaging, we either unilaterally lesioned the trigeminal nerve or occluded one pit organ. We found that accurate targeting is possible on the infrared deprived side. Our results show that neither imaging is absolutely required for accurate predatory targeting, but that performance is affected by alternation of visual input during development. These continuing experiments are providing unique information on the evolution of imaging sensory systems, and on the neural and developmental mechanisms of sensory information processing in the vertebrate brain.

COLE, CHRISTOPHER L., JR. Tau Eta, Catawba College--Dominance and aggression in songbirds.

Dominance is a measure of the ability to exclude other members of the same species from resources. A hierarchy is a description of dominance relationships among members of a group. A bird that ranks low in a hierarchy will generally yield to a higher ranked bird during interactions over resources. These interactions may or may not include aggression. Many studies have explored dominance behavior and aggression, but little is known about the relationship between the two. The goal of my research is to determine whether a well-defined, stable dominance hierarchy is associated with lower levels of aggression. I measured the level of aggression during competitive interactions in Carolina Chickadees (*Poecile carolinensis*) at feeders. The chickadees form stable winter flocks of four to six individuals. These flocks tend to remain in the same area and defend it against other flocks. My research demonstrates that chickadees form linear hierarchies and a bird's rank is not associated with its body size. Dominance interactions typically involve low levels of aggression, but low-ranking individuals occasionally expose themselves to aggression, perhaps to meet their energy demands.

CRAVEN, HEATHER R. Tau Xi, Meredith College--Molecular evolution of the ether-a-gogo gene in *Drosophila melanogaster*.

Potassium channels play an important part in cellular functions and the signaling capacity of excitable cells. A gene known as *ether-a-gogo* (*eag*) encodes one class of potassium channel found in the fruit fly, *Drosophila melanogaster*. *Eag* mutants have been shown to reduce the pupal heart rate in *D. melanogaster*. A question arises as to whether genetic variation of the heart rate in flies could be associated with a defect in the potassium channel genes. As a first step in testing this hypothesis, a dozen alleles, which included lines from *D. melanogaster* and *D. simulans*, were sequenced from a 6kb length of *eag* to detect amino acid polymorphisms that could lead to defects in the function of the potassium channels. From the 115 polymorphic sites found on the *eag* gene, none changed the function of the proteins. Thus, *eag* protein function does not affect heart rate in flies, though variation in expression level may.

FLEEGLE, JACQUELYN. Tau Xi, Meredith College--Isolation of antibiotic resistant *Acinetobacter* spp. from aquatic environments.

As more and more bacteria acquire antibiotic resistances, commonly used antibiotics become ineffective and the need to understand the mechanisms involved increases. We are interested in assessing levels of antibiotic resistance among organisms found in local lakes and ponds. We are also interested in determining whether or not *Acinetobacter* would be a good indicator organism for our geographical area. *Acinetobacter*, a gram-negative bacterium frequently found in soil, water, and sewage, has been used as a marker organism for antibiotic resistance due to its wide distribution and its strong tendency to acquire resistance. Water samples from two locations have been examined. Ten isolates were obtained from the first location and eighteen isolates from the second. The antibiotic resistance patterns of some of these isolates have been tested and demonstrate resistance to multiple antibiotics. Water samples grown on *Acinetobacter* enrichment medium yielded a mixture of organisms. We are in the process of identifying the various isolates.

GAPOL, ARUN. Beta Rho, Wake Forest University--Efficacy of fecal egg shields in the Dogbane Beetle (*Chrysochus auratus* L: Chrysomelidae).

After oviposition the Chrysomelidae beetle *Chrysochus auratus* covers its eggs with a coating of feces. Bare *C. auratus* eggs and fecal covered eggs were presented to the coccinellid egg predator *Coleolegilla maculata*. The predator devoured the bare eggs in all the trials but left the fecal cysts harboring eggs untouched. The fecal coating may be a mechanical barrier to predation or it may repel predators using defensive chemicals derived from the beetle's milkweed diet. In addition, the fecal shields may have additional benefits unrelated to predation.

JONES, JESSICA E. Tau Kappa, Georgia Southern University--
Seasonal variation of mycosporine-like amino acids: when do corals apply sunscreen?

Intracellular photosynthetic algae provide essential nutrients to corals by translocating the products of photosynthesis to the coral animal. Dependence on photosynthesis requires that corals be exposed to sun energy, but also makes them vulnerable to ultraviolet radiation (UVR). To protect themselves from the biologically damaging effects of UVR, corals possess UVR-absorbing compounds called mycosporine-like amino acids (MAAs). I investigated whether the types and concentrations of MAAs in the Caribbean corals *Montastraea annularis*, *Montastraea faveolata*, and *Acropora cervicornis* track seasonal changes in UVR intensities. MAAs were extracted from coral samples collected in June and again in August when UVR intensities are higher. Analysis of absorbance curves for each species showed that the wavelength of maximum absorbance did not change between June and August. This result indicates that there was no significant change in the types of MAAs present in early and late summer. However, the height of absorbance peaks between the first and second sampling period did differ in some species indicating changes in the concentrations of certain MAAs. These analyses indicate that some species may not be as well protected from the high intensities of UVR that are present during the later part of the summer.

LIN, YEN-JWU. Tau Sigma, Gardner-Webb University--Anti-microbial properties of Southwestern plants.

The purpose of this research project was to determine if some Southwestern plant extracts had anti-microbial properties. Seven bacterial strains known to cause human diseases were exposed to plant extracts. The plants were collected, pressed, and extracts were prepared from the leaf and stem. Flowers and seed were also used when available. Plant extracts were made using distilled water, ethanol, and 1% HCl in methanol as solvents. The results of these experiments have shown that certain plants extracts contain anti-microbial properties.

LINDNER, SCOTT E. Sigma Psi, Florida Institute of Technology--
Analysis of cyclin B₁ and DNA synthesis in synchronous populations of leukemic MOLT-4 cells.

Cyclins are critical proteins in regulation of mammalian cell cycle progression, and altered cyclin expression has been demonstrated in many transformed cell lines, thus providing a method for the diagnosis of several cancers. To examine the timing of the expression of cyclin B₁ in correlation to DNA synthesis in a transformed cell line (MOLT-4), a FITC-conjugated antibody to cyclin B₁, the thymidine analog bromodeoxyuridine (BrdU) and the DNA-intercalating dye 7-AAD were utilized to analyze both exponential and synchronous cultures via multi-parameter flow cytometry. The cells were synchronized using the "baby machine" technique, which produces exceedingly pure and minimally distributed

mammalian cell populations in comparison to those produced by standard selection or induction methods. By overlaying the expression of cyclin B₁ and BrdU incorporation as a function of time, it was found that cyclin B₁ expression is closely tied to late S-phase and is degraded in mitosis, and the significant increase in BrdU incorporation between third and sixth hour indicates the initiation of DNA synthesis. This experiment is unique in that it has shown these trends through two complete cycles in non-stressed, steady state cells.

MCGEE, APRIL, MARTIN TAYLOR, & GARY LAMOREUX. Tau Omicron, Francis Marion University.

The reasons for recycling are numerous and are based on the fact that Earth's natural resources are finite and cannot continue to be exploited. Practices at the classroom and academic office level on college and university campuses offer many opportunities for environmental action and can become symbolic of environmental commitment. Universities that pledge to reduce waste are undertaking environmental stewardship that teaches by example. At Francis Marion University, a commitment was made to achieve the 1993 state-mandated goal of a 30% waste reduction. A biology/honors course was developed which allowed students to design a pilot study for recycling at the University. Students performed comparative waste stream inventories before and after recycling bins were placed in campus apartments. Apartments were divided into 3 blocks: those receiving nothing, those receiving recycling bins only, and those receiving recycling bins as well as weekly recycling education materials. Marketing techniques and the creation of a 'Recycling Guide for New Students' were a part of the education program. Rubbish and recyclables were collected and weighed twice weekly for 7 weeks. Apartments with access to recycling bins had less trash than those without. Our data also indicates the impact of education on recycling.

MOSS, NATALIE M., SHELLY ANN FOSTER, JOHN CHIPLEY, & LINDA HENSEL. Beta Omega, Mercer University--Analysis of chlorophyll levels in transgenic and mutant proliferous lines of *Arabidopsis thaliana* in response to varying amounts of the synthetic cytokinin kinetin.

We have isolated lines of *Arabidopsis thaliana* that cease to undergo wild-type meristem arrest resulting in nearly two-fold fruit production. The mutation segregates as a single gene, *pif*, that we call proliferous. We have also obtained a transgenic line that mimics the phenotype. The transgenic line carries the isopentyl transferase (IPT) gene under the control of a senescence-associated gene promoter, *PsAG12*. The IPT gene codes for an enzyme that governs the rate-limiting step in cytokinin production. It is believed that this construct results in the production of cytokinin late in senescence. We have analyzed the sensitivity of mutagenized and transgenic lines to kinetin, a synthetic cytokinin. We have found that the *pif* lines show a substantial and consistent difference from wild-type plants in their response to kinetin. The transgenic lines behave like wild-type plants. These results have led to a modified model or regulation of meristem proliferation. We are now determining if the kinetin-response assay will be useful

as a phenotypic marker. Currently, phenotypes of the second filial generation are determined by fruit production. It takes an extended amount of time to observe the phenotype of the plants. By improving upon our current method of determining phenotype identity, we hope to efficiently map the *plf* gene.

O'SHAUGHNESSY, JOSEPH T., RICHARD M. DILLAMAN, & D. MARK GAY. Sigma Sigma, University of North Carolina at Wilmington--Distribution of a cuticle protein in the dorsal carapace of the juvenile crab, *Callinectes sapidus*.

In the crab, *Cancer pagurus*, a purified and sequenced exoskeletal protein believed to be involved in the calcification process of the cuticle, was described by Andersen (1999). The purpose of this investigation was to determine the distribution of this protein in the dorsal carapace of the crab, *Callinectes sapidus* at two times in its life cycle, as a juvenile and as an adult. Treatment groups were incubated with chicken anti-serum to a unique 18 amino acid motif from the protein described by Andersen followed by incubation with AlexaFlour 488-labeled goat anti-chicken IgG. Sections were viewed under an epifluorescence microscope. In the adult the epicuticle was autofluorescent, the exocuticle did not stain and the endocuticle stained positively, indicating the presence of the 18 amino acid motif. For the juveniles, the entire cuticle was autofluorescent, thereby making detection difficult with a fluorochrome. A different fluorochrome, AlexaFluor 594 was used, but the results were still unclear. A study in progress will use an enzymatic marker and a non-fluorescent chromogen for detection. It is hypothesized that with the use of these new techniques, the distribution of the protein can be determined in the dorsal carapace of both the juvenile and the adult crab, *Callinectes sapidus*.

PATE, SUSAN, ROBERT BOER & CONSTANTINOS MOUSTAKAS. Sigma Sigma, University of North Carolina at Wilmington--Effects of size and salinity on sodium and water permeability in *Callinectes sapidus*.

Juvenile *Callinectes sapidus* have been found in abundance at low salinity areas of the coastal rivers in southeastern North Carolina. This habitat is energetically costly for these animals because they must maintain a hyperosmotic hemolymph concentration. The water and sodium permeabilities of adult and juvenile blue crabs were measured after acclimation to seawater (1000mOsm) or dilute seawater (150 mOsm) in order to understand the osmoregulatory stress juveniles are subjected to. The rate of passive sodium and water efflux, was used as an index of relative permeability. The efflux was measured by incubating the crabs in a radioactive $^{3}\text{H}_2\text{O}$ or $^{22}\text{NaCl}$ medium of the same acclimation salinity for at least 24 hours. The washout of the isotope into non-radioactive media was monitored. The results showed an inverse logarithmic relationship between size and permeability, typical of metabolic rate scaling functions, for both acclimation salinities. Acclimation to 150 mOsm induced a decrease in sodium permeability for all crab sizes, but the decrease was greater for juvenile crabs. The water efflux was unchanged for adult and juvenile blue crabs in 150 mOsm, when

compared to the rate of water efflux in seawater. The osmotic gradient is larger in low salinities; therefore, this data reflects a decrease in water permeability.

ROGERS, EMILY D. Sigma Gamma, Erskine College--The effect of PCBs on metamorphosis and growth of *Xenopus laevis*.

The decline in amphibian populations has acquired local significance with the reported efforts of the EPA to quantify PCB contamination in bodies of water in the Piedmont area of South Carolina. One family of toxicants, PCBs, seem to pose a problem for many mammals, birds and fishes. Since amphibians spend a major part of their lives in water, it is likely that toxicants may readily pass through their skin. PCBs have been found to persist in the environment for lengthy periods of time and to accumulate in the tissues of these organisms. Their persistence and toxicity continue to pose problems for amphibians. The goals of this study were (1) to identify the specific effects of PCBs on the metamorphosis and growth rate of *Xenopus laevis* tadpoles and (2) to monitor the activity of dopamine in the brain. In order to determine the effects of PCBs on the rates of metamorphosis and growth of *Xenopus* tadpoles, we staged and weighed them biweekly. We found that PCBs (Aroclor 1260) had a significant effect on the rates of metamorphosis ($P<0.05$) at a concentration of 10ppm and had no effect on rates of growth. We attempted to monitor the activity of dopamine, a regulator of thyroid activity, using HPLC. Efforts at monitoring the effects of Aroclor 1260 on dopamine activity in the brain gave inconclusive results.

TAYLOR, MARTIN R. Tau Omicron, Francis Marion University--The role of visual and auditory senses in prey detection by the southern toad, *Bufo terrestris*.

Two hypothesis were tested: 1) that prey motion (vision) is used in the detection and subsequent orientation of *Bufo terrestris* toward a prey item; and 2) that prey sound (audition) is used in the detection and subsequent orientation of *B. terrestris* towards a prey item. Two types of sounds were tested: the sound that orthopterans make while moving around on the substrate, and the sound of calling orthopterans. Five experiments were conducted using toads collected on the Francis Marion University campus. Three of the experiments tested vision and the remaining two tested sound. Results support the hypothesis that vision is used in prey detection. It was also found that prey motion is necessary to stimulate toad orientation. Results rejected the hypothesis that prey calls are used as orientation cues by *B. terrestris*, but the sounds of prey locomotion may alert toads to prey presence. Combined results support the hypothesis that vision is used in prey detection and orientation by *B. terrestris*, with certain sounds playing a minor but significant role.

WILLIAMS, LYNNE & LAELA SAYIGH. Sigma Sigma, University of North Carolina at Wilmington--Analysis of signature whistles of adult female bottlenose dolphins.

Signature whistles of nineteen adult female bottlenose dolphins and their multiple (2-5) calves were recorded over a twenty-five year span during capture-release projects in Sarasota, Florida. Visual comparisons of the whistles of mothers and calves showed ten mothers had no calves with whistles similar to their own; two had all calves with similar whistles; two had male calves with similar whistles and female calves with different whistles; and five had earlier calves with different whistles and later calves with similar whistles. Earlier data suggested that mothers having at least one calf with a similar signature whistle might change their whistles over time, while mothers having only calves with different whistles may be less likely to change their whistles. This possible correlation is being tested by examining contours of all the mothers' whistles over time, measuring the frequency ranges of sixteen mothers' whistles over time, testing these frequency ranges for significant changes with regression analyses, and performing paired t-tests of mean frequency ranges of the earliest and latest recordings of all mothers. Preliminary results seem to contradict earlier work showing frequency range changes over time; however, unlike previously, this study used only whistles certain not to be cut off at higher frequencies due to recording limitations.

POSITION ANNOUNCEMENT

Curator of the UNC Herbarium. The Curatorship is a non-tenure track research, teaching, and public service position that reports to the Director of the North Carolina Botanical Garden at the University of North Carolina at Chapel Hill. The Curator is responsible for the overall management of the UNC Herbarium, a collection of 660,000 plant specimens. The Curator supervises the maintenance of the collection and the loan and exchange program, authenticates and approves plant material added to the collection, and supervises the Assistant Curator, graduate students, undergraduates, and volunteers in specimen curation and record keeping. The Curator participates in fund raising that supports his/her own research and the collection as a whole. The Curator is responsible for the overall direction of collection computerization and accessibility on the World Wide Web. The Curator participates in University instruction and outreach courses and may apply for an adjunct position within the Department of Biology. The Curator should have administrative experience and skill, success in obtaining and administering outside funds, experience and skill in working with public outreach, and demonstrated knowledge, experience, and/or potential in field and herbarium-based research. The Herbarium offers unusual opportunities for research on Southeastern plants. PhD preferred. Send a letter of application, curriculum vitae and three letters of reference to Dr. Patricia Gensel, Dept. of Biology, CB# 3280, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599-3375. 919-962-6937. pgensel@bio.unc.edu. Review of applications will begin August 30, 2001. The University is an affirmative action/equal opportunity employer.

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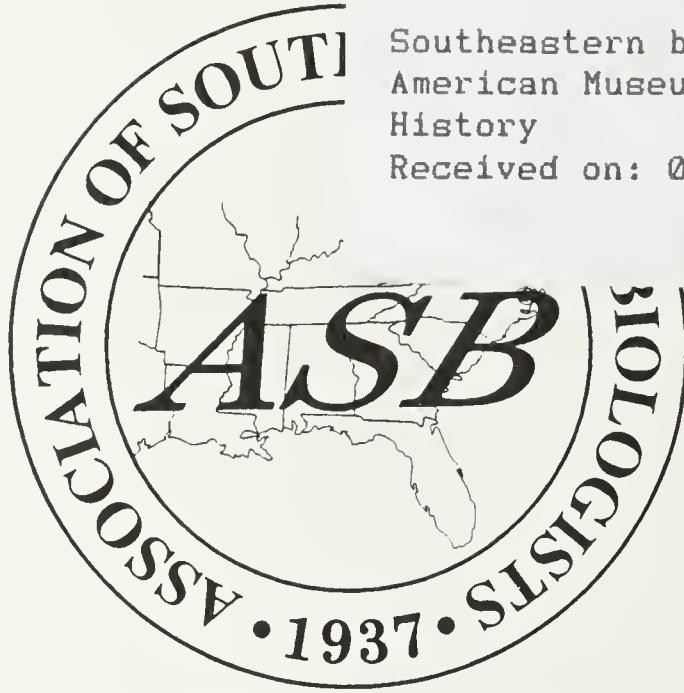
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SOUTHEASTERN BIOLOGY
VOLUME 48, NUMBER 3, September, 2001
<http://www.asb.appstate.edu/>

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